



Australian Government

BUILDING OUR FUTURE



M12 Motorway

Environmental impact statement

Roads and Maritime Services | October 2019



Contents

Contents	i
Certification	viii
Glossary of terms and abbreviations	ix
Executive Summary	xv
1. Introduction	1
1.1 The proposed project.....	1
1.2 Project location	2
1.3 Structure of this environmental impact statement.....	8
2. Assessment process	11
2.1 Approval framework.....	12
2.1.1 Environmental Planning and Assessment Act 1979	12
2.2 Other legislation.....	14
2.2.1 NSW legislation	14
2.2.2 Commonwealth legislation.....	15
3. Strategic justification and project need	17
3.1 NSW and Australian strategic planning and policy framework	17
3.1.1 NSW State Priorities 2015–2019	17
3.1.2 NSW Premier’s Priorities	18
3.1.3 NSW State Infrastructure Strategy	18
3.1.4 Infrastructure Australia priority projects	18
3.1.5 Greater Sydney Region Plan	18
3.1.6 Western Sydney Aerotropolis Land Use and Infrastructure Implementation Plan.....	21
3.1.7 Western Sydney Infrastructure Plan	23
3.1.8 Western Sydney Parklands Plan of Management 2030	25
3.1.9 Future Transport Strategy 2056.....	25
3.1.10 National Road Safety Strategy 2011–2020	25
3.1.11 NSW Key Freight Routes Road Expenditure and Investment Plan	27
3.1.12 NSW Bike Plan	27
3.2 Project need.....	27
3.2.1 Western Sydney Airport and Western Sydney Aerotropolis	27
3.2.2 Access to Western Sydney Aerotropolis.....	28
3.2.3 Growth of Western Parkland City	29
3.2.4 Projected transport and traffic.....	30
3.3 Project objectives.....	31
3.3.1 Western Sydney Infrastructure Plan Program Objectives	31
3.3.2 Project Objectives.....	31
3.4 Statement of strategic need.....	32
4. Project development and alternatives	33
4.1 Alternatives	33
4.1.1 Alternative 1 –‘Do nothing’ (base case)	34
4.1.2 Alternative 2 – Do minimum (upgrading Elizabeth Drive)	35
4.1.3 Alternative 3 – Rail as an alternative mode of transport	36
4.1.4 Alternative 4 – Motorway (the project)	37
4.2 Route options development	39
4.3 Route corridor options – long list	40
4.4 Route options – short list	42

4.5	Route options – modified short list.....	45
4.5.1	Modified Aqua option (A1-B2-C3).....	47
4.5.2	Modified Blue option (A1-B2-C4).....	49
4.5.3	Modified Green option (A1-B5-C3).....	49
4.5.4	Modified Orange option (A1-B5-C4).....	50
4.5.5	Modified Pink option (A3-B2-C3).....	50
4.5.6	Modified Purple option (A3-B2-C4).....	51
4.5.7	Modified White option (A3-B5-C3).....	51
4.5.8	Modified Yellow option (A3-B5-C4).....	52
4.5.9	Evaluation and selection of the preferred route.....	52
4.6	Refinements to the preferred route through the Western Sydney Parklands.....	53
4.6.1	Options within Western Sydney Parklands.....	55
4.6.2	Evaluation and selection of the preferred option.....	55
4.7	Design options and refinements.....	57
4.7.1	Refinement of route corridor alignment.....	57
4.7.2	Interchange/intersection options.....	60
4.7.3	Shared user path options.....	64
4.7.4	General design refinements to avoid or minimise environmental impacts.....	64
4.8	The project.....	66
5.	Project description.....	67
5.1	Project scope.....	68
5.2	Design criteria.....	69
5.3	Urban design objectives and principles.....	82
5.4	Protection of airspace around Western Sydney Airport.....	82
5.4.1	Obstacle limitation surface.....	83
5.4.2	Procedures for Air Navigation Services – Operations surfaces.....	83
5.5	National Airports Safeguarding Framework.....	83
5.5.1	Guideline C – Managing the Risk of Wildlife Strikes in the Vicinity of Airports.....	85
5.5.2	Guideline E – Managing the Risk of Distractions to Pilots from Lighting in the Vicinity of Airports.....	85
5.5.3	Guideline F – Managing the Risk of Intrusions into the Protected Airspace of Airports.....	85
5.5.4	Guideline G – Protecting Aviation Facilities – Communications, Navigation and Surveillance (CNS)86	
5.5.5	Guideline I – Public Safety Areas (PSAs).....	86
5.6	Alignment.....	86
5.7	Road grade and lane widths.....	87
5.7.1	Road grade.....	87
5.7.2	Lane widths.....	87
5.8	Operational footprint.....	88
5.9	Pavement.....	88
5.10	Intersections and interchanges.....	101
5.10.1	M7 Motorway interchange.....	101
5.10.2	Western Sydney Airport interchange.....	103
5.10.3	The Northern Road intersection.....	104
5.11	Local road changes and upgrades.....	106
5.11.1	Road intersections and upgrades.....	106
5.11.2	Local road overpasses.....	108
5.12	Bridges.....	109
5.13	Water management.....	121
5.13.1	Drainage and stormwater management.....	121

5.13.2	Operational water quality controls	122
5.13.3	Potential waterway adjustments	124
5.14	Fencing (including fauna exclusion fencing)	128
5.15	Cuttings and embankments	128
5.16	Roadside furniture, line marking and lighting	128
5.16.1	Safety barriers	128
5.16.2	Line marking	129
5.16.3	Signposting	129
5.16.4	Lighting	129
5.17	Operational ancillary facilities and traffic management	130
5.17.1	Speed and lane use management	130
5.17.2	Flow monitoring	131
5.17.3	Traveller information – variable message signs	131
5.17.4	Ramp metering	131
5.17.5	Video surveillance: closed circuit television	131
5.17.6	Intelligent transport system	132
5.18	Emergency or incident facilities	132
5.19	Noise mitigation	132
5.20	Utility services	132
5.21	Provisions for pedestrians and cyclists	138
5.22	Provision for public transport	138
5.23	Property access and acquisition	139
5.23.1	Property access	139
5.23.2	Property acquisition	139
5.24	Construction	143
5.24.1	Construction footprint	143
5.24.2	Overview of construction works	144
5.24.3	Construction ancillary facilities	144
5.24.4	Early works	159
5.24.5	Earthworks	160
5.24.6	Demolition	161
5.24.7	Pavements	161
5.24.8	Bridge works	162
5.24.9	Drainage works	163
5.24.10	Potential waterway adjustments	165
5.24.11	Temporary works	166
5.24.12	Finishing works	167
5.24.13	Construction workforce	168
5.24.14	Construction work hours	168
5.24.15	Extended construction hours	168
5.24.16	Out-of-hours work	169
5.24.17	Traffic management and access	170
5.24.18	Construction materials	181
5.24.19	Spoil and waste disposal	182
5.24.20	Construction program	183
6.	Consultation	187
6.1	Community and stakeholder engagement overview	188
6.2	Consultation prior to public exhibition of the EIS	191
6.2.1	Activities carried out before public exhibition of the EIS	191
6.2.2	Feedback received before public exhibition of the EIS	202
6.3	Consultation during public exhibition of the EIS	212

6.3.1	Display of the EIS	212
6.3.2	Supporting EIS display	212
6.3.3	Preparation of the submissions report	213
6.4	Consultation before construction	213
6.5	Consultation during construction	213
6.5.1	Approach to consultation during construction	213
6.5.2	Complaints management procedure.....	214
6.5.3	Managing complaint fatigue.....	215
6.5.4	Managing regular complainants.....	216
6.5.5	Managing construction fatigue.....	216
7.	Assessment of key issues	217
7.1	Biodiversity	223
7.1.1	Policy and planning setting	228
7.1.2	Assessment methodology.....	231
7.1.3	Existing environment	234
7.1.4	Assessment of potential impacts	277
7.1.5	Cumulative impacts	295
7.1.6	Environmental management measures	298
7.1.7	Biodiversity Offsets	302
7.2	Transport and traffic.....	305
7.2.1	Policy and planning setting	306
7.2.2	Assessment methodology.....	306
7.2.3	Existing environment	316
7.2.4	Existing road network performance	324
7.2.5	Assessment of potential construction impacts.....	327
7.2.6	Assessment of potential operational impacts	334
7.2.7	Cumulative impacts	361
7.2.8	Environmental management measures	364
7.3	Urban design, landscape character and visual amenity	367
7.3.1	Policy and planning setting	368
7.3.2	Assessment methodology.....	369
7.3.3	Existing environment	372
7.3.4	Urban design	374
7.3.5	Landscape character impact assessment	394
7.3.6	Visual impact assessment	401
7.3.7	Cumulative impacts	424
7.3.8	Environmental management measures	426
7.4	Socio-economic, land use and property	430
7.4.1	Policy and planning setting	431
7.4.2	Assessment methodology.....	432
7.4.3	Existing environment	435
7.4.4	Assessment of potential impacts	454
7.4.5	Cumulative impacts	472
7.4.6	Environmental management measures	473
7.5	Aboriginal heritage.....	476
7.5.1	Policy and planning setting	477
7.5.2	Assessment methodology.....	478
7.5.3	Existing environment	485
7.5.4	Assessment of potential impacts	510
7.5.5	Cumulative Impacts	514
7.5.6	Environmental management measures	518

7.6	Non-Aboriginal heritage	523
7.6.1	Policy and planning setting	524
7.6.2	Assessment methodology.....	524
7.6.3	Existing environment	529
7.6.4	Assessment of potential impacts	542
7.6.5	Cumulative impacts	552
7.6.6	Environmental management measures	552
7.7	Noise and vibration	560
7.7.1	Policy and planning setting	561
7.7.2	Assessment methodology.....	561
7.7.3	Construction noise and vibration assessment methodology	562
7.7.4	Operational noise and vibration assessment methodology	570
7.7.5	Existing environment	573
7.7.6	Assessment of potential construction impacts.....	578
7.7.7	Assessment of potential operational impacts	602
7.7.8	Cumulative impacts	609
7.7.9	Environmental management measures	612
7.8	Flooding.....	619
7.8.1	Policy and planning setting	620
7.8.2	Assessment methodology.....	621
7.8.3	Existing environment	625
7.8.4	Assessment of potential impacts	627
7.8.5	Cumulative impacts	643
7.8.6	Environmental management measures	645
7.9	Surface water quality and hydrology.....	648
7.9.1	Policy and planning setting	650
7.9.2	Assessment methodology.....	656
7.9.3	Existing environment	661
7.9.4	Assessment of potential impacts	668
7.9.5	Cumulative impacts	711
7.9.6	Environmental management measures	711
7.10	Groundwater quality and hydrology	721
7.10.1	Policy and planning setting	723
7.10.2	Assessment methodology.....	724
7.10.3	Existing environment	735
7.10.4	Assessment of potential impacts	744
7.10.5	Cumulative impacts	749
7.10.6	Environmental management measures	751
8.	Assessment of other issues	755
8.1	Soils and contamination.....	755
8.1.1	Policy and planning setting	756
8.1.2	Assessment methodology.....	757
8.1.3	Existing environment	760
8.1.4	Assessment of potential impacts	777
8.1.5	Cumulative impacts	784
8.1.6	Environmental management measures	787
8.2	Air quality	790
8.2.1	Policy and planning setting	790
8.2.2	Assessment methodology.....	791
8.2.3	Existing environment	799
8.2.4	Assessment of potential impacts	803

8.2.5	Cumulative impacts	838
8.2.6	Environmental management measures	842
8.3	Health and safety	844
8.3.1	Policy and planning setting	845
8.3.2	Assessment methodology	845
8.3.3	Existing environment	848
8.3.4	Assessment of potential impacts	853
8.3.5	Opportunities for health improvement.....	865
8.3.6	Environmental management measures	865
8.4	Sustainability.....	867
8.4.1	Policy and planning setting	867
8.4.2	Sustainability implementation	875
8.4.3	Ecologically sustainable development	881
8.4.4	Environmental management measures	882
8.5	Waste.....	883
8.5.1	Policy and planning setting	884
8.5.2	Assessment methodology.....	885
8.5.3	Construction waste	886
8.5.4	Operational waste.....	897
8.5.5	Cumulative impacts	899
8.5.6	Environmental management measures	900
8.6	Climate change risk and greenhouse gas	901
8.6.1	Policy and planning setting	902
8.6.2	Assessment methodology.....	903
8.6.3	Existing environment	911
8.6.4	Assessment of potential impacts	914
8.6.5	Cumulative impacts	923
8.6.6	Environmental management measures	925
9.	Summary of environmental management measures.....	927
9.1	Environmental management framework	927
9.2	Construction Environmental Management Plan	927
9.2.1	CEMP Sub-plans	929
9.2.2	Non-conformance and corrective action	929
9.3	Summary of management measures.....	929
10.	Environmental risk analysis	968
10.1	Overview.....	968
10.1.1	Likelihood and consequence ratings	969
10.2	Risk analysis approach.....	971
10.3	Residual impacts	984
10.3.1	High and medium residual risk	984
10.3.2	Low residual risk.....	984
11.	Project justification and conclusion	985
11.1	Justification.....	985
11.1.1	Project justification.....	985
11.1.2	Objects of the EP&A Act.....	991
11.1.3	Ecologically sustainable development	993
11.2	Conclusion.....	997
12.	References	999

Appendices

Appendix	Appendix name
Appendix A	Project synthesis
Appendix B	Secretary's Environmental Assessment Requirements checklist
Appendix C	Environmental Planning and Assessment Regulation 2000 (NSW), Part 3 of Schedule 2 checklist
Appendix D	Schedule 4 of the Environment Protection and Biodiversity Conservation Regulations 2000 (Commonwealth) checklist
Appendix E	Biodiversity assessment report
Appendix F	Transport and traffic assessment report
Appendix G	Landscape character, visual impact assessment and urban design report
Appendix H	Socio-economic land use and property assessment report
Appendix I	Aboriginal cultural heritage assessment report
Appendix J	Non-Aboriginal heritage assessment report
Appendix K	Noise and vibration assessment report
Appendix L	Flooding assessment report
Appendix M	Surface water quality and hydrology assessment report
Appendix N	Groundwater quality and hydrology assessment report
Appendix O	Soils and contamination assessment report
Appendix P	Air quality assessment report
Appendix Q	Environmental Record of Proponent

Certification

Submission of environmental impact statement

Prepared under Division 5.2 of the *Environmental Planning and Assessment Act 1979*.

Environmental impact statement prepared by:

Name: Tim Colman

Qualifications: Bachelor of Urban and Regional Planning, Masters of Business Administration

Address: Jacobs Group (Australia) Pty Ltd
7/177 Pacific Highway, North Sydney, NSW 2060

Responsible person:

Name: Deanne Forrest, Senior Project Development Manager
Roads and Maritime Services

Address: 27-31 Argyle Street
Parramatta NSW 2150

Proposed development:

M12 Motorway

Address of the land on which the infrastructure to which the statement relates:

Land between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham for a distance of about 16 kilometres within the local government areas of Fairfield, Liverpool and Penrith.

Description of the infrastructure to which the statement relates:

Construction and operation of the M12 Motorway, which would provide direct access between the Western Sydney Airport at Badgerys Creek and Sydney's motorway network. The M12 Motorway would run between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham for a distance of about 16 kilometres and would be opened to traffic prior to opening of the Western Sydney Airport. The Motorway would comprise a dual carriageway, an interchange at the M7 Motorway, a grade-separated interchange connecting with the Western Sydney Airport Main Access Road, a signalised intersection at The Northern Road, bridge structures, active transport facilities and other features as described within the environmental impact statement.

Environmental impact statement:

An environmental impact statement is attached addressing all matters in accordance with Division 5.2 of the *Environmental Planning and Assessment Act 1979*.

Declaration: I certify that I have prepared the contents of this environmental impact statement in response to the Secretary's environmental assessment requirements dated 30 October 2018 and the relevant provisions of Schedule 2 of the Environmental Planning and Assessment Regulation 2000. To the best of my knowledge the information contained in the environmental impact statement is not false or misleading.

Signature:



Name: Tim Colman

Date: 24 September 2019

Glossary of terms and abbreviations

Term	Meaning
AAR	Archaeological assessment report
ACHAR	Aboriginal cultural heritage assessment report
AEP	Annual exceedance probability: the chance of a flood of a given or larger size occurring in any one year, usually expressed as a per centage. For example, if a peak flood discharge of 500 m ³ /s has an AEP of 5%, then there is a 5% chance of that discharge event (or larger event) occurring in any one year.
AF	Ancillary facility
AFG	Aboriginal focus group
Afflux	Afflux refers to the predicted changes, usually in flood levels, between two scenarios, pre-development conditions (without project) and post-development conditions (with project). Positive afflux indicates flood level increase under post-development conditions and negative afflux indicates flood level decrease under post-development conditions comparing to pre-development conditions.
AHIMS	Aboriginal Heritage Information Management System
Airport access road	Part of the M12 Motorway connecting the Western Sydney Airport interchange with the Western Sydney Airport
Ancillary facilities	A temporary facility for construction of the project including an office and amenities compound, construction compound, material crushing and screening plant, materials storage compound, maintenance workshop, testing laboratory and material stockpile area.
Average annual daily traffic	The total volume of traffic passing a roadside observation point over a period of a year, divided by the number of days per year. It is calculated from mechanically obtained axle counts
ARI	Average recurrence interval: Used to describe the frequency or probability of floods occurring (eg a 100 year ARI event is a flood that occurs or is exceeded on average once every 100 years). The long-term average number of years between the occurrence of a flood as big as, or larger than, the selected event. For example, floods with a discharge as great as, or greater than, the 20-year ARI flood event will occur on average once every 20 years. ARI is another way of expressing the likelihood of occurrence of a flood event.
Auxiliary lane	Additional length of lane on a motorway added to maintain traffic flow, such as at an entry or exit ramp, acceleration or deceleration lane
BAR	Biodiversity assessment report
Batter	A receding slope of a wall, structure, or earthwork
BBCC	BioBanking credit calculator
BC Act	<i>Biodiversity Conservation Act 2016</i> (NSW)
BCE	Badgerys Creek East
BCW	Badgerys Creek West
BH	Borehole
Bilateral agreement	The bilateral agreement made under section 45 of the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth) relating to environmental assessment

Term	Meaning
BRA	building restricted areas
BVT	Biometric vegetation type
BWB	Badgerys Creek West B
CAMBA	China-Australia Migratory Bird Agreement
CASA	Civil Aviation Safety Authority
CCE	Cosgroves Creek East
CCTV	Closed circuit television
CCW	Cosgroves Creek West
CEMP	Construction environment management plan
CHL	Commonwealth Heritage List
CHR	Cecil Hills Ridge
CHRP	Cecil Hills Ridge PAD
CNS	Communications, navigation and surveillance
Code	Code of Practice for Archaeological Investigation of Aboriginal Objects in NSW (2010)
Construction footprint	The construction footprint is the area required to build the project. This includes the area required for temporary work such as sedimentation basins, drainage lines, access roads, construction ancillary facilities.
CSSI	Critical state significant infrastructure
CSIRO	Commonwealth Scientific and Industrial Research Organisation
Curing	Curing is the process of maintaining suitable moisture content and temperature in newly poured concrete to allow it to set with the desired properties for its intended use
CWRMP	Construction waste and resource management plan
DACHA	Darug Aboriginal Cultural Heritage Assessments
DCAC	Darug Custodian Aboriginal Corporation
DECCW	Department of Environment, Climate Change and WaterNSW
DGA	Dense graded asphalt
DLO	Darug Land Observations
DNC	Didge Ngunawal Clan
DoEE	Department of the Environment and Energy
DITCRD	Department of Infrastructure, Transport, Cities and Regional Development
DP	Deposited plan
DPC (Heritage)	Department of Premier and Cabinet (Heritage)
DPE	Department of Planning and Environment
DPI	Department of Primary Industries
DPIE	Department of Planning, Industry and Environment

Term	Meaning
EEC	Endangered ecological community
EESG of DPIE	Environment, Energy and Science Group of the Department of Planning, Industry and Environment (former NSW Office of Environment and Heritage)
EIL	Ecological investigation levels
EIS	Environmental impact statement
ENSR Australia Pty Ltd	An environmental consulting firm now a subsidiary to AECOM Australia Pty Ltd.
EP&A Act	<i>Environmental Planning and Assessment Act 1979</i> (NSW)
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (Commonwealth).
ERP	Estimated resident population
ESL	Ecological screening levels
Exclusion zones	Exclusion zones are areas of environmental importance (eg threatened vegetation or heritage items) that need to be protected. Exclusion zones are shown in figures throughout this EIS where relevant. These exclusion zones are defined as no-go areas and are to be protected for the duration of construction in that particular footprint area.
FBA	Framework for Biodiversity Assessment
FM Act	<i>Fisheries Management Act 1994</i> (NSW)
GDE	Groundwater dependent ecosystems
GHG	Greenhouse gas
Grade separated interchange	An interchange that is separated vertically (at different heights) involving bridges, underpasses and/or overpasses.
GTP	Geotechnical test pit
Heritage Act	<i>Heritage Act 1977</i> (NSW)
HIL	Health investigation levels
IBRA	Interim Biogeographical Regionalisation of Australia
ICOMOS	International Council on Monuments and Sites
IMT	Indurated mudstone tuff
JAMBA	Japan-Australia Migratory Bird Agreement
Kawul	Kawul Cultural Services
KCE	Kemps Creek East
KCW	Kemps Creek West
KNW	Kemps Creek North West
kV	Kilovolt, a measure of electric current equal to 1,000 volts
KYWG	Kamilaroi-Yankuntjatjara Working Group
LALC	Local Aboriginal Land Council
LEP	Local Environmental Plan
LGA	Local government area

Term	Meaning
LoS	Level of Service
LU14	The 2014 version of land use (population and employment) projections for the Sydney Greater Metropolitan Area produced by the Transport and Performance Analytics section of Transport for NSW. This 2014 land use data has been supplemented with traffic data from 2015 and 2017.
M12 Motorway	The proposed M12 Motorway which is the subject of this document (also known as 'the project')
M7 Motorway	A major connecting road on Sydney's orbital motorway network. It runs for 40 kilometres and links the M5 Motorway with the M4 Motorway and the M2 Motorway.
MNES	Matters of National Environmental Significance
MPs	Members of parliament
NCA	Noise Catchment Area
NHL	National Heritage List
NOHC	Navin Officer Heritage Consultants
NPW Act	<i>National Parks and Wildlife Act 1974 (NSW)</i>
NRAR	Natural Resource Access Regulator
NSW	New South Wales
NTAR	National Trust of Australia (NSW) register
OEH	Office of Environment and Heritage
OGA	Open graded asphalt
Operational footprint	Generally includes the M12 Motorway and additional areas required for operation and maintenance of the project
OSO	The Outer Sydney Orbital is a future transport corridor being investigated by the NSW Government which will provide for a connection between Box Hill in the north and the Hume Motorway near Menangle in the south. The OSO will provide for a major transport link (motorway and/or freight rail line) between western Sydney's growth areas, connecting with the future Western Sydney Airport and future employment lands.
PACHCI	Procedure for Aboriginal cultural heritage consultation and investigation (Roads and Maritime, 2011)
PAD	Potential archaeological deposit
PCT	Plant community type
PSA	Public safety areas
RAAF	Royal Australian Air Force
RAP	Registered Aboriginal Party
RIAR Group of DPIE	Regions, Industry, Agriculture and Resources Group of the Department of Planning, Industry and Environment (former Department of Industry)
RNE	Register of the National Estate
Roads and Maritime	Roads and Maritime Services

Term	Meaning
ROKAMBA	Republic of Korea-Australia Migratory Bird Agreement
RR	Range Road, Cecil Park, NSW
SA2	Statistical Area Level 2 (Australian Bureau of Statistics): medium-sized general purpose areas designed around whole suburbs or localities, generally with a population range of 3000 to 25,000 persons. The smallest area for the release of ABS non-Census and Intercensal statistics (ABS, 2016)
SCE	South Creek East
SCW	South Creek West
SEARs	Secretary's environmental assessment requirements
Sensitive road users	Pedestrians and cyclists
SEPP	State environmental planning policy
SHI	State Heritage Inventory
SHR	State Heritage Register
SOHI	Statement of heritage impact
SSI	State significant infrastructure
Study area	Describes the area investigated as part of this EIS. References to study area varies according to the specific environmental issue under consideration (eg ecology, heritage, noise, visual amenity etc) and is described within each relevant section of the EIS.
TECs	Threatened ecological communities
The project	M12 Motorway
The EP&A Regulation	Environmental Planning and Assessment Regulation 2000
TNR	The Northern Road
TP	Test pit
TfNSW	Transport for NSW
TSC Act	<i>Threatened Species Conservation Act 1995</i> (NSW) (repealed) but relevant for this assessment due to being saved under the BC Transitional arrangements
TSPD	Threatened Species Profile Database
BioNet VIS	BioNet Vegetation Information System
VMS	Variable Messaging Signs
Western Sydney Aerotropolis	As defined in the Western Sydney Aerotropolis Stage 1 Plan, the Aerotropolis surrounds the Western Sydney Airport site at Badgerys Creek and will comprise industrial, commercial and residential development.
Western Sydney Airport	The future Western Sydney International Airport at Badgerys Creek
WSA Co	Western Sydney Airport Corporation, a government business enterprise wholly owned by the Australian Government
Western Sydney Parklands Biobank Site	Area shown in Figure 7-5 (in Biodiversity chapter) (Biobanking Agreement Site ID 119).
WIG	Widescope Indigenous Group

Term	Meaning
WSAGA	<p>Now known as the Western Sydney Aerotropolis. See above.</p> <p>Western Sydney Airport Growth Area is defined in the Western Sydney Infrastructure Plan, and will include industrial, commercial and residential development surrounding the Western Sydney Airport site in Badgerys Creek.</p>
WSIP	Western Sydney Infrastructure Plan
WSPT	Western Sydney Parklands Trust
Wylde Mountain Bike Trail	<p>The Wylde Mountain Bike Trail is a publicly accessible mountain bike riding trail located in the Western Sydney Parklands which caters for intermediate, competent and advanced standard mountain bike riders.</p>

Executive Summary

Roads and Maritime Services (Roads and Maritime) is seeking approval under Part 5, Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to construct and operate the M12 Motorway project (the project) to provide direct access between the Western Sydney Airport at Badgerys Creek and Sydney's motorway network. The M12 Motorway would run between the M7 Motorway at Cecil Hills and The Northern Road at Luddenham for a distance of about 16 kilometres and is expected to be opened to traffic prior to opening of the Western Sydney Airport.

What is proposed?

The project would include the following key features:

- A new dual-carriageway motorway between the M7 Motorway and The Northern Road with two lanes in each direction with a central median allowing future expansion to six lanes
- Motorway access via three interchanges/intersections:
 - A motorway-to-motorway interchange at the M7 Motorway and associated works (extending about four kilometres within the existing M7 Motorway corridor)
 - A grade separated interchange referred to as the Western Sydney Airport interchange, including a dual-carriageway four lane airport access road (two lanes in each direction for about 1.5 kilometres) connecting with the Western Sydney Airport Main Access Road
 - A signalised intersection at The Northern Road with provision for grade separation in the future
- Bridge structures across Ropes Creek, Kemps Creek, South Creek, Badgerys Creek and Cosgroves Creek
- Bridge structure across the M12 Motorway into Western Sydney Parklands to maintain access to the existing water tower and mobile telephone/other service towers on the ridgeline in the vicinity of Cecil Hills, to the west of the M7 Motorway
- Bridge structures at interchanges and at Clifton Avenue, Elizabeth Drive, Luddenham Road and other local roads to maintain local access and connectivity
- Inclusion of active transport (pedestrian and cyclist) facilities through provision of pedestrian bridges and an off-road shared user path including connections to existing and future shared user path networks
- Modifications to the local road network, as required, to facilitate connections across and around the M12 Motorway including:
 - Realignment of Elizabeth Drive at the Western Sydney Airport, with Elizabeth Drive bridging over the airport access road and future passenger rail line to the airport
 - A realignment of Clifton Avenue over the M12 Motorway, with associated adjustments to nearby property access
 - Relocation of Salisbury Avenue cul-de-sac, on the southern side of the M12 Motorway
 - Realignment of Wallgrove Road north of its intersection with Elizabeth Drive to accommodate the M7 Motorway northbound entry ramp
- Adjustment, protection or relocation of existing utilities
- Ancillary facilities to support motorway operations, smart motorways operation in the future and the existing M7 Motorway operation, including gantries, electronic signage and ramp metering
- Other roadside furniture including safety barriers, signage and street lighting
- Adjustments of waterways, where required, including Kemps Creek, South Creek and Badgerys Creek
- Permanent water quality management measures including swales and basins
- Establishment and use of temporary ancillary facilities, temporary construction sedimentation basins, access tracks and haul roads during construction
- Permanent and temporary property adjustments and property access refinements as required.

The key features of the project are shown in **Figure A-1**.

Construction of the project is expected to begin in 2022 and conclude in 2025, with works occurring concurrently across the full length of the construction footprint during this period.

The project overview presented in this environmental impact statement (EIS) represents the proposed project design. If the project is approved, a further detailed design process would follow, which may include variations to the design presented in this EIS in response to submissions received following the exhibition of the EIS, or if opportunities arise to further minimise potential environmental impacts.

What are the project objectives?

The project objectives are to:

- Provide sufficient road capacity to meet traffic demand generated by the planned western Sydney urban development
- Provide a high standard connection to Western Sydney Airport with capacity to meet future freight and passenger needs
- Provide a road which supports and integrates with the broader transport network
- Support the provision of an integrated regional and local public transport system
- Preserve the access function of Elizabeth Drive
- Provide active local transport within the east–west corridor
- Make provision for connection to the future Outer Sydney Orbital.

Why is it needed?

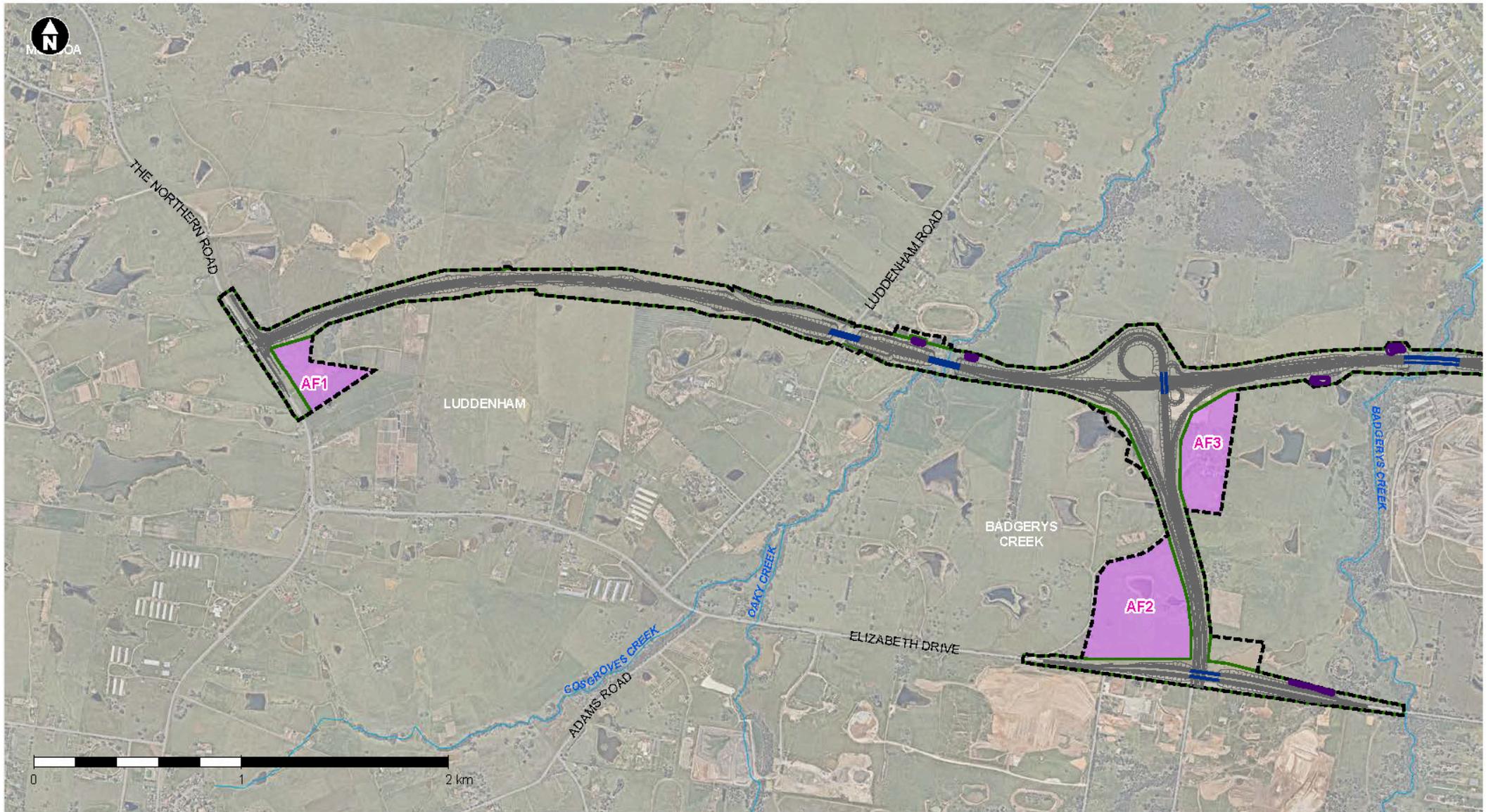
Western Sydney Airport and planned development associated with the Aerotropolis, employment lands and the South West Growth Area is expected to drive population growth in western Sydney, with about one million additional people living in the region by 2031. This population growth and land use changes will significantly increase traffic, placing increasing demand on the existing local and regional road network.

Road network modelling indicates that, with the expected growth many roads in the existing network would be at or near capacity in the future. Without the project, ageing, narrow or lower-order roads would perform a traffic function that is better suited to motorway infrastructure. Relying on lower-order roads reduces amenity and results in congestion, increased travel times, reduced travel time reliability and more traffic incidents.

The project is considered essential to the State due to the role the proposed M12 Motorway would have in supporting the planned development in Western Sydney and providing access to the Western Sydney Airport, the Aerotropolis, employment lands and South West Growth Area. It is required to fulfil the goals and objectives of numerous strategic planning instruments, including:

- The NSW State Infrastructure Strategy
- The Greater Sydney Commission's Greater Sydney Region Plan
- The Western Sydney Aerotropolis Land Use and Infrastructure Implementation Plan.

The Minister for Planning and Public Spaces has declared the project as critical state significant infrastructure (CSSI).



- The project
- Construction footprint**
- The project construction footprint
- Ancillary facilities
- Operational footprint**
- The project operational footprint
- Bridges
- Permanent water quality basins
- ~ Waterways
- Motorway
- Main roads

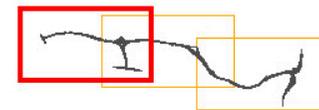


Figure A-1 Key features of the project

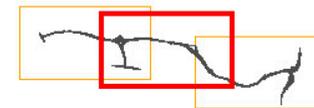
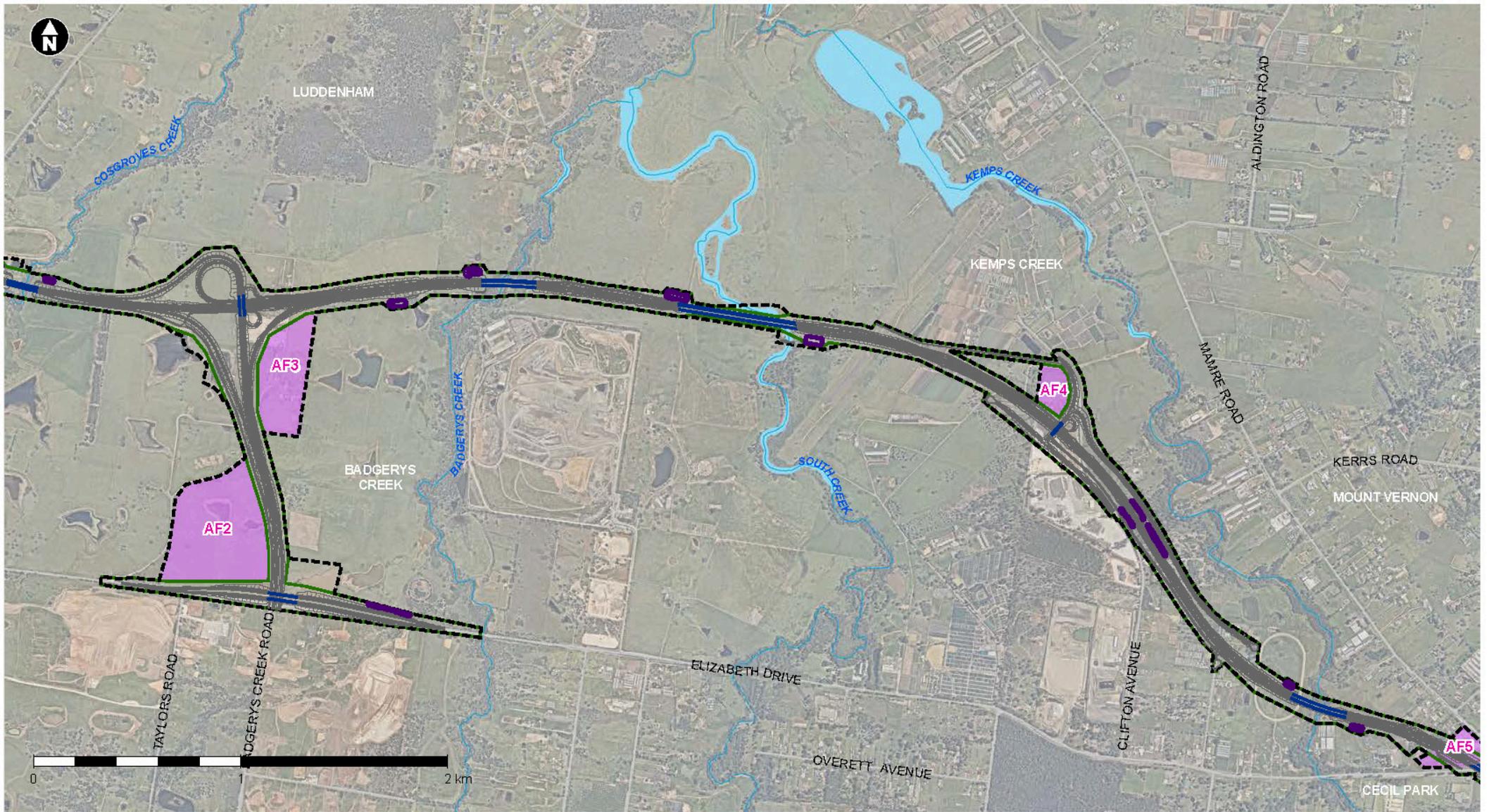
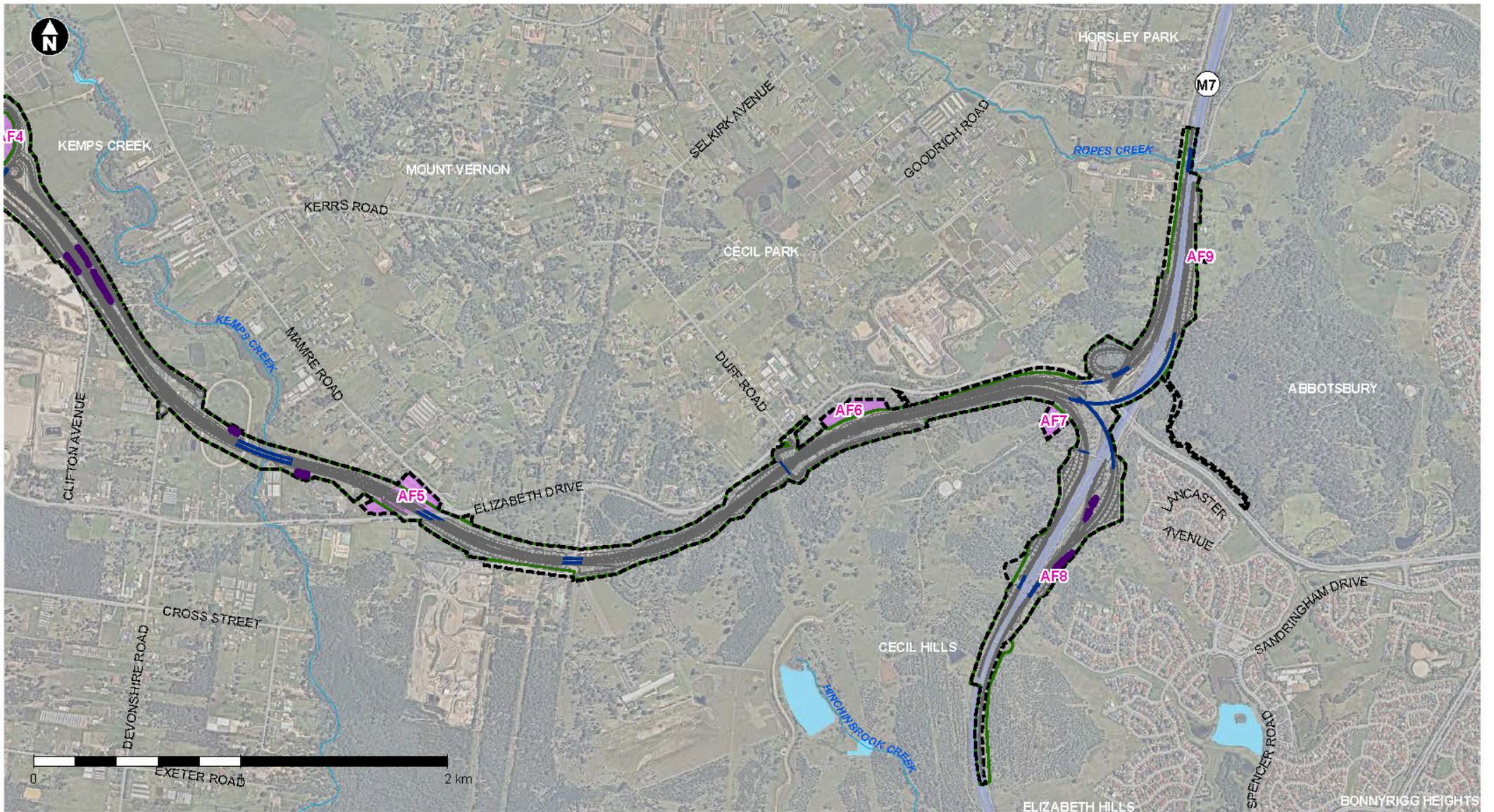


Figure A-1 Key features of the project



- The project
- Construction footprint**
- - - The project construction footprint
- Ancillary facilities
- Operational footprint**
- The project operational footprint
- Bridges
- Permanent water quality basins
- ~ Waterways
- Motorway
- Main roads

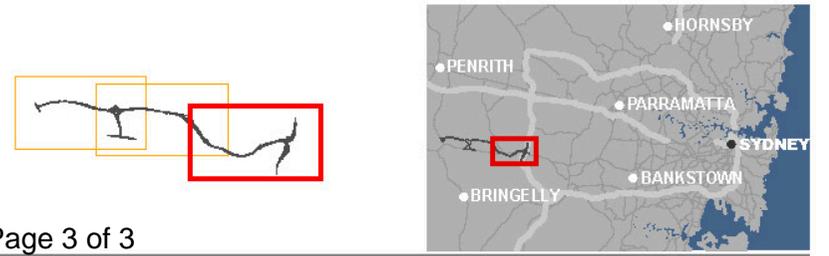


Figure A-1 Key features of the project

How would the project satisfy this need?

The project would support and maintain Western Sydney Airport and the surrounding Aerotropolis as the catalyst for economic growth in western Sydney by providing a high-speed motorway-standard access from the Sydney motorway network at the M7 Motorway; and the arterial road network at The Northern Road. The project would provide an alternative east–west route between the M7 Motorway and The Northern Road, reducing the volumes on Elizabeth Drive and reducing traffic movements at key intersections such as the M7 Motorway and Elizabeth Drive interchange.

The project would provide a reliable transport link for an increasing number of residents in western Sydney to access nearby jobs, housing and transport, health facilities, schools and social infrastructure. The proposed M12 Motorway is a critical component to improving road network efficiency across western Sydney in the long-term, and is part of a wider integrated transportation plan that includes public transport initiatives.

The project supports the freight and commercial transport task associated with the expected economic growth in western Sydney. It would provide connections for the distribution of goods and services across Greater Sydney; and connections between Western Sydney Airport and the Aerotropolis to other employment areas and population centres via the Sydney motorway network.

Why is it a Division 5.2 project?

Clause 94 of the State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP) applies to development for the purpose of a road or road infrastructure facilities and provides that these types of works are development which is permissible without consent. The project is appropriately classified as being for the purpose of a “road” and a “road infrastructure facility” under the Infrastructure SEPP.

Clause 14 of the State Environmental Planning Policy (State and Regional Development) 2011 (State and Regional Development SEPP) declares development as State Significant Infrastructure (SSI) if it is permissible without consent and specified in Schedule 3.

Clause 1 of Schedule 3 of the State and Regional Development SEPP specifies that:

- (1) Infrastructure or other development that ... would be an activity for which the proponent is also the determining authority and would, in the opinion of the proponent, require an environmental impact statement to be obtained under Part 5 of the [EP&A] Act.*

Roads and Maritime has formed the opinion that the project is likely to significantly affect the environment and would require an EIS to be prepared. Consequently, the project is SSI under Division 5.2 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and is subject to approval by the NSW Minister for Planning and Public Spaces.

Why is a referral to the Australian Government required?

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), if a proposed action has the potential to significantly impact on matters of national environmental significance (MNES) or the environment of Commonwealth land, or if the action is being carried out by a Commonwealth agency, it must be referred to the Australian Government. If the Australian Minister for the Environment determines that a referred project is a “controlled action”, approval for the project would be required by that Minister as well as the NSW Minister for Planning and Public Spaces.

The Australian Government determined the project is a controlled action under Section 75 of the EPBC Act due to its potential for significant impact on listed threatened species and communities (section 18 and 18A of the EPBC Act). The Australian Government also confirmed the action will be assessed under the “Bilateral agreement made under section 45 of the EPBC Act relating to environmental assessment between Commonwealth of Australia and the State of New South Wales” (Bilateral Agreement) (2015). This agreement accredits the assessment process under Division 5.2 of the EP&A Act. The Australian Minister for the Environment would then need to issue a separate approval for the project.

What alternatives were considered?

The project development process included consideration of possible alternative ways of meeting the project objectives and providing access to western Sydney and the Western Sydney Airport. The following alternatives were considered:

- Alternative 1 – Do nothing
- Alternative 2 – Do minimum (upgrading Elizabeth Drive)
- Alternative 3 – Alternative modes of transport
- Alternative 4 – Motorway (the project).

The project was selected as preferred to take forward for further development because it would provide a safe, modern, high-capacity motorway to support future increased traffic generation (freight and passenger) associated with the Western Sydney Airport and development in western Sydney.

Once it was determined that a motorway was the preferred way to meet the project objectives, the preferred route for the project was selected based on the relative overall performance when compared with other route options. Consideration was given to environmental and social impacts including impact on existing land use, impacts on threatened or endangered ecological communities, impact on utilities and impacts on existing roads.

The preferred route option and design for the project was refined through an extensive assessment and review process to ensure that it best addresses the project objectives, and meets the key performance criteria of function, environmental and socio-economic considerations, and provides value for money.

How did the community participate in selecting the preferred project?

Community consultation and participation was carried out through the early planning phase starting in mid-2015, shortlisting of the route options in early 2016, announcement of the preferred route in November 2016, and the announcement of the preliminary design and access strategy in early 2018.

Community feedback helped to inform the selection of the preferred route option and subsequent design development. Community consultation would continue through the detailed design, construction and operational stages, should the project be approved.

What are the main beneficial outcomes expected?

The project would help address Sydney's future transport challenges as follows:

- It would provide an essential road link, with the Sydney motorway network, to support the planned Western Sydney Airport, Western Sydney Aerotropolis and surrounding urban development
- It would facilitate the Greater Sydney Region Plan's goal of delivering a 30-minute city through providing efficient and reliable access to jobs within 30 minutes of people's homes in western Sydney
- It would serve Greater Sydney's highly diverse freight and business transport task by providing connections for the distribution of goods and services across Greater Sydney; and connections between Western Sydney Airport and the Aerotropolis to other employment areas and population centres via the Sydney motorway network. It would service the expected traffic growth associated with Greater Sydney's growing population and economy
- Overall the project would generally improve operational traffic conditions in the study area, particularly in the evening peak, leading to lower delays and higher average speeds across the network
- The landscape and urban design concept for the project is aligned with the vision for the Parkland City and will help establish a consistent theme to support the Western Sydney Airport as a 'gateway to Sydney'. The project vision is to maintain 'connection to Country', which would interpret and celebrate local Aboriginal and non-Aboriginal cultural heritage values
- A safe cycle and pedestrian link would be provided where similar infrastructure does not currently exist

- The project would provide a motorway alignment that:
 - Minimises impact on listed threatened ecological communities and species
 - Protects riparian corridors and enables future public connections through these corridors
 - Minimises impact on existing roads and land uses
 - Maintains the integrity and landscape character of Western Sydney Parklands.

What are the main adverse outcomes expected and how will they be managed?

Many potential environmental and social impacts were avoided through the selection of the preferred route and design refinements during the project development process. However, there would be some temporary and permanent impacts on the environment associated with the construction and operation of the project.

The EIS identifies comprehensive environmental management measures to avoid, manage, mitigate, offset and/or monitor impacts during construction and operation of the project. These include best practice environmental planning and management techniques, urban design and landscaping treatments and noise mitigation measures. The design, construction and operation of the project would be carried out in accordance with these identified management measures, as well as any additional measures identified in the project's conditions of approval.

Key environmental management measures outlined in this EIS include the preparation of a comprehensive construction environmental management plan (CEMP) to manage environmental impacts during pre-construction and construction. The CEMP would include several sub-plans to manage specific issues identified in the EIS.

Further mitigation requirements are likely to be identified during detailed design and construction planning and in consultation with communities and relevant stakeholders. Ongoing consultation would include integration and engagement with surrounding major projects with the view to mitigating and managing potential cumulative impacts during construction and operation.

A summary of the main issues and key management measures identified in the EIS is outlined below.

Biodiversity

The main potential biodiversity impacts include:

- Direct removal of about 74 hectares of native vegetation, including about 1.85 hectares of an existing biobanking site within Western Sydney Parklands and other native vegetation classified as threatened ecological communities and one critical endangered ecological community (CEEC)
- Indirect impacts on native vegetation including fragmentation and edge effects
- Direct and indirect impacts on two threatened plant species including removal of *Dillwynia tenuifolia* (244 individuals) and removal of *Pultenaea parviflora* (90 individuals)
- Removal of threatened fauna habitat, amounting to about 55.6 hectares of Woodland and Riparian Forest habitat, about 275 hectares of Grassland habitat and about 3.7 hectares of Wetlands and Watercourses. This includes:
 - About 0.9 hectares of potential breeding habitat and about 3.7 hectares of potential foraging habitat for Southern Myotis
 - About 1.9 hectares of potential habitat for Cumberland Plain Land Snail
 - About 55.6 hectares of potential foraging habitat for five threatened microbat species
 - About 3.7 hectares of potential foraging habitat and possible removal of one active nest for White-bellied Sea Eagle
- Impacts on riparian corridors and minor changes to hydrology at watercourses due to construction of bridges and possible creek adjustments.

Threatened species and threatened species habitat removal would be reduced during detailed design. A construction flora and fauna management plan would be prepared as part of the CEMP that would include measures to avoid or minimise impacts on sensitive ecological areas and revegetate/restore disturbed areas.

For residual impacts that cannot be avoided, biodiversity offsets are being secured in accordance with the Biodiversity Offset Strategy prepared specifically for the project. Revegetation would prioritise Cumberland Plain Woodland and local native species grown from locally sourced seed. Consideration would be given to ensure landscape works are compatible with the relevant guidelines of the National Airports Safeguarding Framework (NASF) regarding bird strike close to the Western Sydney Airport.

Transport and traffic

Projected future traffic growth in the region is generated mainly by the Western Sydney Airport and surrounding urban development, rather than because of the project itself.

However, during construction, high numbers of construction vehicle movements may temporarily affect the surrounding road network, particularly heavy vehicles. The construction phase would require temporary traffic arrangements, cyclist and/or pedestrian diversions, road occupation, temporary road closures and temporary changes to speed limits.

The project would result in improved intersection performance along the Elizabeth Drive corridor between The Northern Road and Mamre Road. But for intersections east of Mamre Road, trips using this section of Elizabeth Drive would not have access to M12 Motorway as alternative route, so the improvement in intersection performance in this section would be limited.

Although the number of conflicting traffic movements at the Elizabeth Drive – M7 Motorway interchange would be reduced, forecast traffic demand would still exceed the capacity of this interchange and it would continue to operate at an unsatisfactory level of service with the project.

Travel times along the M7 Motorway may increase with the project in the morning peak period. Generally small increases in travel time would be due to additional merging of traffic at the M7 Motorway interchange. This merging would generate localised delays, particularly in the northbound direction.

Travel times on The Northern Road from Elizabeth Drive, northbound to the M4 Motorway, would also increase with the project. This would be due to traffic from the Western Sydney Airport in the evening peak using the M12 Motorway and The Northern Road to travel north to the M4 Motorway. Without the project, some of that traffic would otherwise travel via Luddenham Road.

Travel time on the M12 Motorway would increase between 2026 and 2036, reflecting the forecast growth traffic volumes associated with the Western Sydney Airport, particularly eastbound to the M7 Motorway. Although travel times would increase over time as traffic demand grows, the change is small (less than five minutes along the length of the motorway), which demonstrates that the project has sufficient capacity to perform acceptably with forecast 2036 traffic volumes.

A construction transport and traffic management plan will be prepared as part of the CEMP, which would outline measures to maintain access to properties, signage strategy and management of construction vehicles access and movement. Ongoing consultation would continue with affected community members in accordance with a Community Communication Strategy that would be prepared for the project to manage impacts during construction.

Consultation with the Traffic Management Centre and Northwest Roads will continue regarding the management of potential operational traffic impacts.

Urban design, landscape character and visual impact

The introduction of a substantial infrastructure element into an existing Cumberland Plain landscape would have landscape character impacts ranging from moderate-low to high. A high landscape character impact would be expected around the proposed Western Sydney Airport interchange, where the existing relatively flat terrain would be affected by the scale of the interchange and the realignment of Elizabeth Drive over the project. Areas where the project would transverse the Western Sydney Parklands and fragment the residual land between the project and Elizabeth Drive would also be expected to experience a high landscape character impact.

Potential visual impacts from elements such as permanent lighting, possible noise barriers, earthworks and large structures range from low, where the views of the project would be generally at a distance such as in areas of agricultural land, to high where existing high-quality rural views are relatively undisturbed and close to residential receivers, or where the scale of the project significantly impacts the integrity of the view.

Key potential visual impacts during construction primarily relate to residential receivers that would have views of construction activities. Impacts are likely to include:

- Building removal
- Tree removal
- Visibility or overshadowing of temporary structures
- Temporary noise barriers
- Hoardings
- Visibility of ancillary facilities, including construction machinery, plant operations and site offices
- Temporary lighting
- Increased vehicle movements and personnel in the area.

Balarinji (an Aboriginal-owned organisation) was engaged to manage the Aboriginal cultural heritage design process that informed the concept design to create a unique and distinct identity interpreting a rich sense of place, that embraces Aboriginal and cultural heritage across the project. The findings and recommendation of this process will be incorporated into the urban design and implemented as part of the project, including interpretive initiatives.

An Urban Design and Landscape Plan (UDLP) will be prepared as part of the CEMP to minimise landscape character and visual impacts and detail the implementation of landscape features to be installed as part of the project, including revegetation requirements. Where possible, re-vegetation would prioritise Cumberland Plain Woodland and local native species grown from locally sourced seed with consideration to the requirements of the NASF as noted above. A tree management strategy will also be prepared for the project, which would describe requirements for the replacement trees including provisions for a net increase in the number of trees (not identified as within an endangered ecological community).

Socio-economic, land use and property

Property acquisition for the project would directly impact 41 properties, with about 36 of those partially acquired and five properties fully acquired. Temporary leases of land would also be required to accommodate ancillary construction facilities.

Potential acquisition and temporary leases of land for the project would impact on about 10 properties currently used for commercial uses, including agribusinesses. Other directly affected properties include land within the Western Sydney Parklands at Cecil Hills, managed by the Western Sydney Parklands Trust. The significance of land use and property impacts was evaluated as being moderate to low, with the potential localised fragmentation of Western Sydney Parklands as High-Moderate.

Permanent adjustments would be required to some private properties, including adjustments to access, fencing and farm infrastructure including farm dams, sheds, and shade houses, due to partial property acquisition. Partial property acquisition may also result in severance or fragmentation of some rural properties and impacts on the efficiency of property management and farming operations.

The project would directly impact on existing social infrastructure including about 90 hectares of land within the Western Sydney Parklands, including bushland and walking trails. The Wylde Mountain Bike Trail would be directly impacted, including the jump run, pump track, kids loop, sections of the three-kilometre, six-kilometre and 12-kilometre trails and associated facilities, including shelters. The project would result in the permanent loss of facilities and sections of trails within the operational footprint, requiring the redesign and relocation of these facilities.

Roads and Maritime is continuing to work working with the Western Sydney Parklands Trust to design, plan and deliver a replacement trail for the Wylde Mountain Bike Trail prior to construction of the project.

During construction, potential impacts on local amenity and character for communities and areas close to construction works and construction compounds would mainly result from:

- Noise, vibration, dust and traffic from construction activities
- Changes in visual amenity due to the removal of established vegetation and presence of construction works
- Potential light spill from night-time construction works.

Potential amenity issues arising during construction would be managed in accordance with the management measures outlined in the CEMP and relevant sub plans including a noise and vibration management plan, an air quality management plan and the UDLP.

Consultation with affected landowners will continue in accordance with a Community Communication Strategy that would be prepared for the project and all property acquisition would be carried out in accordance with the requirements of *Land Acquisition (Just Terms Compensation) Act 1991*.

Aboriginal heritage

There are 19 Aboriginal sites that would be directly impacted by the project. Most of the Aboriginal sites consist of broad distributions of Aboriginal stone artefacts associated with major creeks. Of these 19 sites, 11 would be subject to partial harm, which means they extend beyond the construction footprint and would be left partially intact. Eight of the sites are located entirely within the construction footprint and would be impacted completely.

Three areas associated with recorded sites are designated high Aboriginal cultural heritage significance and would be impacted by the project, including:

- A small knoll immediately to the west of Badgerys Creek
- A large area on a rise and floodplain between Badgerys Creek and South Creek
- A prominent ridgeline overlooking the M7 Motorway.

These three areas are not gazetted Aboriginal Places under S86(4) of the NPW Act but were identified by the Registered Aboriginal Parties during fieldwork as having values of local significance.

A heritage interpretation framework will be prepared to guide development of the detailed urban design for the project and will draw on the findings and recommendation of the Aboriginal cultural heritage design process managed by Balarinji (2018a, 2018b).

A construction cultural heritage management plan will be prepared as part of the CEMP and will outline procedures and exclusion zones for avoiding impacts on known Aboriginal heritage items.

A detailed Aboriginal Cultural Salvage Strategy will also be prepared for the project in consultation with project Registered Aboriginal Parties and NSW Office of Environment and Heritage to guide the salvage excavation process for Aboriginal sites.

Non-Aboriginal heritage

The project would have a major impact on four heritage items and a minor impact on one item:

- McGarvie Smith Farm (State significance, major impact)
- McMaster Field Station (State significance, major impact)
- Fleurs Aerodrome (local significance, major impact)
- Cecil Park School, Post Office and Church Site (local significance, major impact)
- The Fleurs Radio Telescope Site (State and potential national significance, minor impact)

There would be a negligible impact on four other heritage items where the project was able to avoid direct impacts:

- Luddenham Road Alignment
- Upper Canal System
- Exeter Farm Archaeological Site
- South, Kemps and Badgers Creek Confluence Weirs Scenic Landscape.

A construction cultural heritage management plan will be prepared as part of the CEMP and will outline procedures and exclusion zones for avoiding impacts on known non-Aboriginal heritage items.

Noise and vibration

The highest impacts during construction would be experienced at relatively low numbers of residential receivers to the east of the M7 Motorway and north of Elizabeth Drive at the eastern end of the project, north of Elizabeth Drive near Salisbury Ave and near Clifton Avenue in the north of the construction footprint.

During the standard daytime working hours 'peak' impacts are predicted in these areas, with 'moderate' impacts expected at a relatively small number of receivers east of the M7 Motorway and South of Elizabeth Drive at the eastern end of the project.

Night-time works are only proposed in certain areas (associated with bridges, roadworks and ancillary facilities), with only a small number of receivers predicted to have 'Peak' impacts around Clifton Avenue and Salisbury Avenue. 'Moderate' impacts are predicted east of the M7 Motorway, along Elizabeth Drive to about Kemps Creek, and near Luddenham Road at the western end of the project. Compliant noise levels or 'minor' impacts are predicted for the rest of the study area.

About 19 structures or buildings that may be sensitive to vibration (generally associated with vibratory rollers and rock breakers) are located within the recommended minimum working distance, including the Upper Canal and two high pressure gas pipelines.

About 262 receivers (183 individual buildings) are predicted to be affected by new or increased road traffic noise impacts during operation and eligible for consideration of additional noise mitigation.

A construction noise and vibration management plan will be prepared as part of the CEMP and will include procedures for extended and out-of-hours work as well as measures to minimise vibration impacts on structures (eg M7 Motorway bridge piers, WaterNSW Upper Canal and high-pressure gas mains). Further consultation with utility owners will be carried out to identify vibration criteria for assets and in-situ vibration monitoring will be carried out during construction.

Where feasible and reasonable, operational road noise mitigation measures may include at-source and at-property noise treatments. Appropriate measures would be considered in order of preference from at-source treatment through quieter road pavement surfaces, noise mounds, noise barriers or as a least preferred treatment option, at-property treatments.

Flooding

Flood modelling results show that the project would have no flooding impact on existing buildings in the area surrounding the project. Outside of the project's operational footprint, the proposed flooding conditions are predicted to be largely the same as existing, even during large flooding events like the 100-year ARI.

The modelling of the main creeks shows there is minimal increase to existing afflux levels and surrounding land use would be unaffected by this increase. However, modelling of the minor drainage lines indicates that an increase in volumes and rates of flow would potentially impact surrounding land use. This would need to be managed through mitigation such as detention basins and scour protection, which would be considered during detailed design.

Flood modelling during detailed design will incorporate updated regional flood modelling to account for expected major development in surrounding areas.

A construction flood management plan would be prepared as part of the CEMP and would include requirements for ongoing monitoring to minimise potential impacts during construction.

Surface water quality and hydrology

Existing water quality in the project area has generally been assessed as poor, with elevated nutrient levels and low dissolved oxygen and heavy metals. However, several downstream water bodies were identified as sensitive receiving environments. The project's design has therefore incorporated a number of measures to ensure that the quality of stormwater runoff from the M12 Motorway during construction and operation contributes toward the achievement of the NSW Water Quality Objectives.

During construction, the project's potential impacts include the release of pollutants into downstream waterways and sensitive receiving environments, which could impact on stream health and aquatic flora and fauna. Construction may also result in erosion and sedimentation of downstream watercourses, from uncontrolled stormwater runoff.

Construction soil and water management plan would be prepared as part of the CEMP and would include measures to manage water quality during construction and outline erosion and sediment control measures that would need to be implemented.

During both construction and operation, the main risks to downstream water quality would be from the release of pollutants including sediment, hydrocarbons, metals and nutrients contained in stormwater runoff requiring mitigation through temporary and permanent water quality control structures such as sediment basins and swales.

During operation, there is unlikely to be a significant change to hydrology and flow distribution across the broader catchment. However, there is the potential for localised changes in flow from one sub-catchment to the next. An increase in flows could result in additional water supply and more frequent overtopping of some farm dams, and potentially increase the risk of flooding, scour and erosion. Conversely, a decrease in flow due to changed flow paths could result in a reduced water supply to some farm dams. These operational impacts are considered minor and manageable through the adoption of appropriate measures.

Cumulative impacts

Based on consideration of project size (with a focus on major projects), location (proximity to the project) and timing (considering overlap of construction and operation), the following projects were considered in the assessment of potential cumulative impacts:

- Western Sydney Airport (approved and under construction)
- Sydney Metro Greater West (not yet approved)
- The Northern Road upgrade (approved and under construction):
 - Stage 5 – Littlefields Road to Glenmore Park
 - Stage 6 – Littlefields Road to Eaton Road

- Other existing and potential road network upgrades (not yet approved):
 - Elizabeth Drive upgrade
 - Mamre Road upgrade
 - Outer Sydney Orbital
- Major land releases and strategic Government projects including:
 - Western Sydney Aerotropolis
 - South West Growth Area
 - Western Sydney Employment Area.

During construction, potential cumulative impacts are likely where the construction periods occur concurrently or are consecutive. Potential impacts may include impacts on biodiversity, traffic and transport, socio-economic (including acquisition and temporary land use changes), heritage, amenity (noise and vibration; and air quality), soils, contamination and surface water (including hydrology and water quality); and resource and waste management (including the demand for construction materials and generation of waste).

Construction fatigue may be experienced by receivers that are close to concurrent or consecutive project construction activities where there is little or no break between the activities. Where construction timeframes for projects occur sequentially, there is potential for disturbance and disruptions for local communities (eg construction noise, dust, traffic delays and disruptions) to occur over extended periods.

The main area that would experience adverse cumulative impacts, particularly construction fatigue, is the western portion of the project, where the interaction with major projects including the Western Sydney Airport and Sydney Metro Greater West would occur for much of the construction program.

There may be some cumulative impacts generated during concurrent operation of the project and other major projects close by. Cumulative amenity and socio-economic impacts associated with the combined operation of the Western Sydney Airport, Sydney Metro Greater West, and the project are likely to include noise, air quality and visual impacts, and permanent land use changes. There may also be some indirect cumulative biodiversity impacts associated with lighting and noise impacts.

Given the scale of the surrounding major projects and the expected future land use changes in the area, the project itself is expected to only contribute a relatively minor amount to potential cumulative impacts, particularly when considering the scale of operations and potential for amenity impacts associated with Western Sydney Airport once operational.

Ongoing integration and engagement with surrounding major projects will be carried out with the view to minimising and managing potential cumulative impacts.

How can I comment on the proposal and/or the environmental impact statement?

The Department of Planning, Industry and Environment (DPIE) will place this EIS on public exhibition for a minimum of 28 days in accordance with the EP&A Regulation. During this period, it will be available for inspection at the DPIE website <https://www.planningportal.nsw.gov.au/major-projects/project/10226>, on the Roads and Maritime project website <http://rms.nsw.gov.au/m12>, at selected Roads and Maritime offices, and at various staffed displays in the region. Copies of the EIS would be available for viewing at the following locations:

- Roads and Maritime office: 20-44 Ennis Road, Milsons Point NSW 2061
- Department of Planning, Industry and Environment: 320 Pitt Street, Sydney 2000
- Nature Conservation Council: 14/338 Pitt Street, Sydney 2000
- Western Sydney Airport Experience Centre: Eaton Road, Luddenham
- Service NSW Centres (electronic copies available only)

- Council offices:
 - Fairfield City Council: 86 Avoca Road, Wakeley 2176
 - Liverpool City Council: 33 Moore Street, Liverpool 2170
 - Penrith City Council: Civic centre 601 High Street, Penrith NSW 2750
 - Camden Council: 70 Central Ave, Oran Park 2570
- Libraries:
 - St Clair Library: Shop 12, St Clair Shopping Centre, Bennett Road and Endeavour Avenue 2759
 - Wetherill Park Library: 561–583 Polding St, Wetherill Park 2164
 - Carnes Hill Library: 600 Kurrajong Rd, Carnes Hill 2171.

Roads and Maritime will also be conducting community information sessions. A project email address (m12motorway@rms.nsw.gov.au) and phone number (1800 517 155) were established to manage enquiries and provide information on the EIS.

To provide feedback on the project, a person may make written submissions to the Secretary of the DPIE during the exhibition period. All submissions received will be placed on the DPIE website.

To make a submission, use the online form if possible. This is available at www.planningportal.nsw.gov.au/major-projects/projects/on-exhibition

If you cannot lodge online, you can write to the address below:

Attn: Director Transport Assessments
Department of Planning, Industry and Environment
GPO Box 39
Sydney NSW 2001

If you want the Department to delete your personal information before publication, please make this clear at the top of your letter.

1. Introduction

This chapter introduces the M12 Motorway project (the project), providing a brief outline of its need, scope, and location. It also outlines the structure of this environmental impact statement (EIS).

1.1 The proposed project

Roads and Maritime Services (Roads and Maritime) proposes to build the M12 Motorway to provide the main access to the Western Sydney Airport and Sydney's motorway network. The M12 Motorway would run east–west between the M7 Motorway at Cecil Hills and The Northern Road (TNR) at Luddenham for a distance of around 16 kilometres. The project is shown in **Figure 1-1** in relation to the regional context and **Figure 1-2** in relation to the local context.

The project is illustrated in **Figure 1-3** and comprises the following key features:

- A new dual-carriageway motorway between the M7 Motorway and The Northern Road with two lanes in each direction with a central median allowing future expansion to six lanes
- Motorway access via three interchanges/intersections:
 - A motorway-to-motorway interchange at the M7 Motorway and associated works (extending about four kilometres within the existing M7 Motorway corridor)
 - A grade-separated interchange referred to as the Western Sydney Airport interchange, including a dual-carriageway four-lane airport access road (two lanes in each direction for about 1.5 kilometres) connecting with the Western Sydney Airport Main Access Road
 - A signalised intersection at The Northern Road with provision for grade separation in the future
- Bridge structures across Ropes Creek, Kemps Creek, South Creek, Badgerys Creek and Cosgroves Creek
- A bridge structure across the M12 Motorway into Western Sydney Parklands to maintain access to the existing water tower and mobile telephone/other service towers on the ridgeline in the vicinity of Cecil Hills, to the west of the M7 Motorway
- Bridge structures at interchanges and at Clifton Avenue, Elizabeth Drive, Luddenham Road and other local roads to maintain local access and connectivity
- Inclusion of active transport (pedestrian and cyclist) facilities through provision of pedestrian bridges and an off-road shared user path including connections to existing and future shared user path networks
- Modifications to the local road network, as required, to facilitate connections across and around the M12 Motorway including:
 - Realignment of Elizabeth Drive at the Western Sydney Airport, with Elizabeth Drive bridging over the airport access road and future passenger rail line to the airport
 - Realignment of Clifton Avenue over the M12 Motorway, with associated adjustments to nearby property access
 - Relocation of Salisbury Avenue cul-de-sac, on the southern side of the M12 Motorway
 - Realignment of Wallgrove Road north of its intersection with Elizabeth Drive to accommodate the M7 Motorway northbound entry ramp
- Adjustment, protection or relocation of existing utilities
- Ancillary facilities to support motorway operations, smart motorways operation in the future and the existing M7 Motorway operation, including gantries, electronic signage and ramp metering
- Other roadside furniture including safety barriers, signage and street lighting
- Adjustments of waterways, where required, including Kemps Creek, South Creek and Badgerys Creek
- Permanent water quality management measures including swales and basins

- Establishment and use of temporary ancillary facilities, temporary construction sedimentation basins, access tracks and haul roads during construction
- Permanent and temporary property adjustments and property access refinements as required.

A detailed description of the project is provided in **Chapter 5**. Approval for the project is being sought under Division 5.2 of the *Environmental Planning and Assessment Act 1979* (NSW) (EP&A Act). In addition, the project was determined as a controlled action under Section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) (EPBC Act). As such, the project requires assessment and approval under the EPBC Act.

The (Commonwealth) Department of the Environment and Energy (DoEE) has determined the project's controlled action status based on its potential to impact on six matters of national environmental significance (MNES), which include listed threatened species and communities (Section 18 and 18A of the EPBC Act).

This EIS was prepared based on the design set out in this document. Subject to the project's approval, the project's design and construction methodology would be refined by the contractor in conjunction with Roads and Maritime before works begin.

The project is required to support the opening of the Western Sydney Airport by connecting Sydney's motorway network to the airport. The project would also serve and facilitate growth and development within the Western Sydney Aerotropolis (described in **Section 3.2.2**) and the South West Growth Area (see **Figure 1-2**). The project would provide increased road capacity and reduce congestion and travel times in the future.

The project forms a key part of the ***Western Sydney Infrastructure Plan*** (WSIP), a joint initiative of the Australian and NSW governments to fund a \$4.1 billion road and transport linkages investment program for western Sydney (Roads and Maritime, 2016a). The project currently has combined funding of \$1.8 billion from the Australian and NSW Governments. Construction is expected to start in the first quarter of 2022 and finish in 2025 prior to the opening of the Western Sydney Airport.

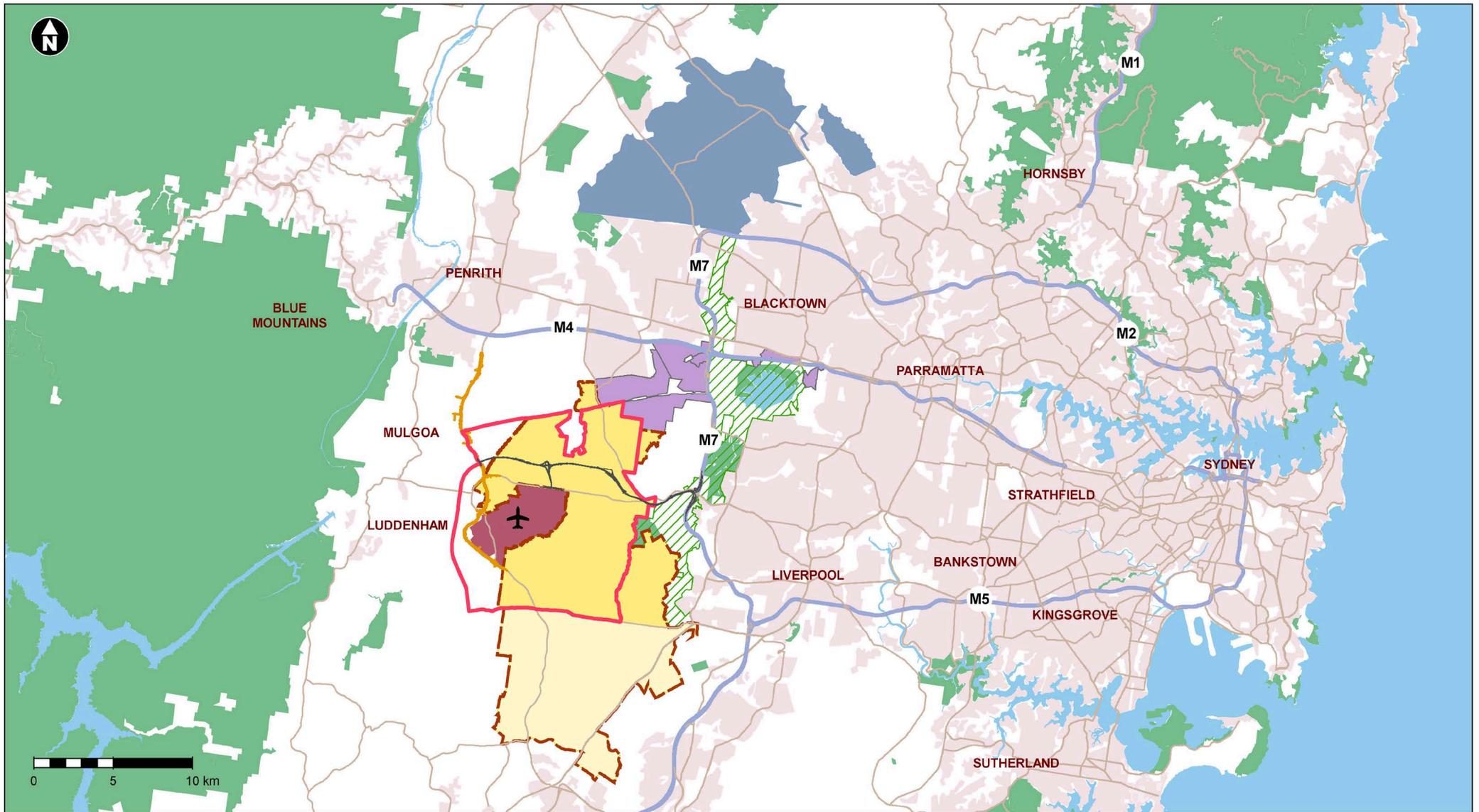
1.2 Project location

The project would start about 30 kilometres west of the Sydney central business district (CBD), at its connection with the M7 Motorway at Cecil Hills and end at The Northern Road at Luddenham. The project would traverse three local government areas (LGAs) – Penrith to the north, Fairfield to the east and Liverpool to the south. The M12 Motorway would pass through the Western Sydney Parklands at the project's eastern extent.

The project would traverse the following suburbs, from east to west:

- Abbotsbury
- Cecil Park
- Cecil Hills
- Mount Vernon
- Kemps Creek
- Badgerys Creek
- Luddenham.

As shown in **Figure 1-1**, the project would be mostly located within greenfield area of the South West Growth Area and the Western Sydney Aerotropolis (formerly known as the Western Sydney Priority Growth Area). The Western Sydney Employment Area is located around six kilometres north-north-east of the project.

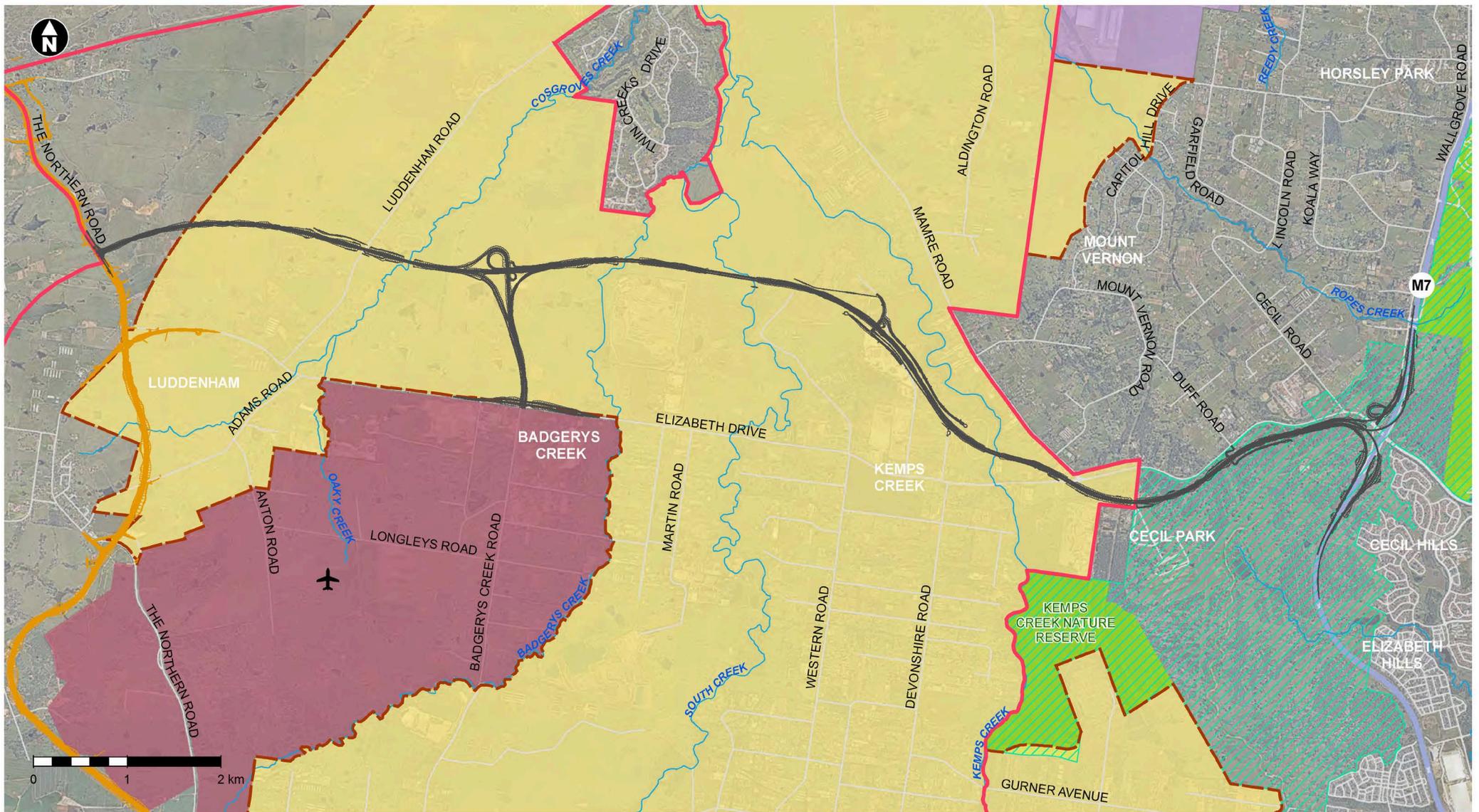


- The project
- Motorways
- Existing main roads
- The Northern Road upgrade (currently under construction)
- Western Sydney Parklands
- NPWS estate / reserve
- Urban areas
- Main waterbodies
- Growth areas**
- Western Sydney Priority Growth Area
- South West Priority Growth Area
- South West Growth Area
- Western Sydney Airport
- Western Sydney Aerotropolis
- Western Sydney Employment Area
- North West Growth Area



Figure 1-1 Project location – regional context

Date: 18/07/2019 Path: J:\E\Projects\04_Eastern\145100\08_Spatial\GIS\Directory\Templates\WXDs\Figures\EIS\Chapters\Chapter1_Introduction\Final\EIS\JA\JV_EIS_Chap1_F001_ProjectOverview_Regional_r5v1.mxd Created by: AA | QA by: NS

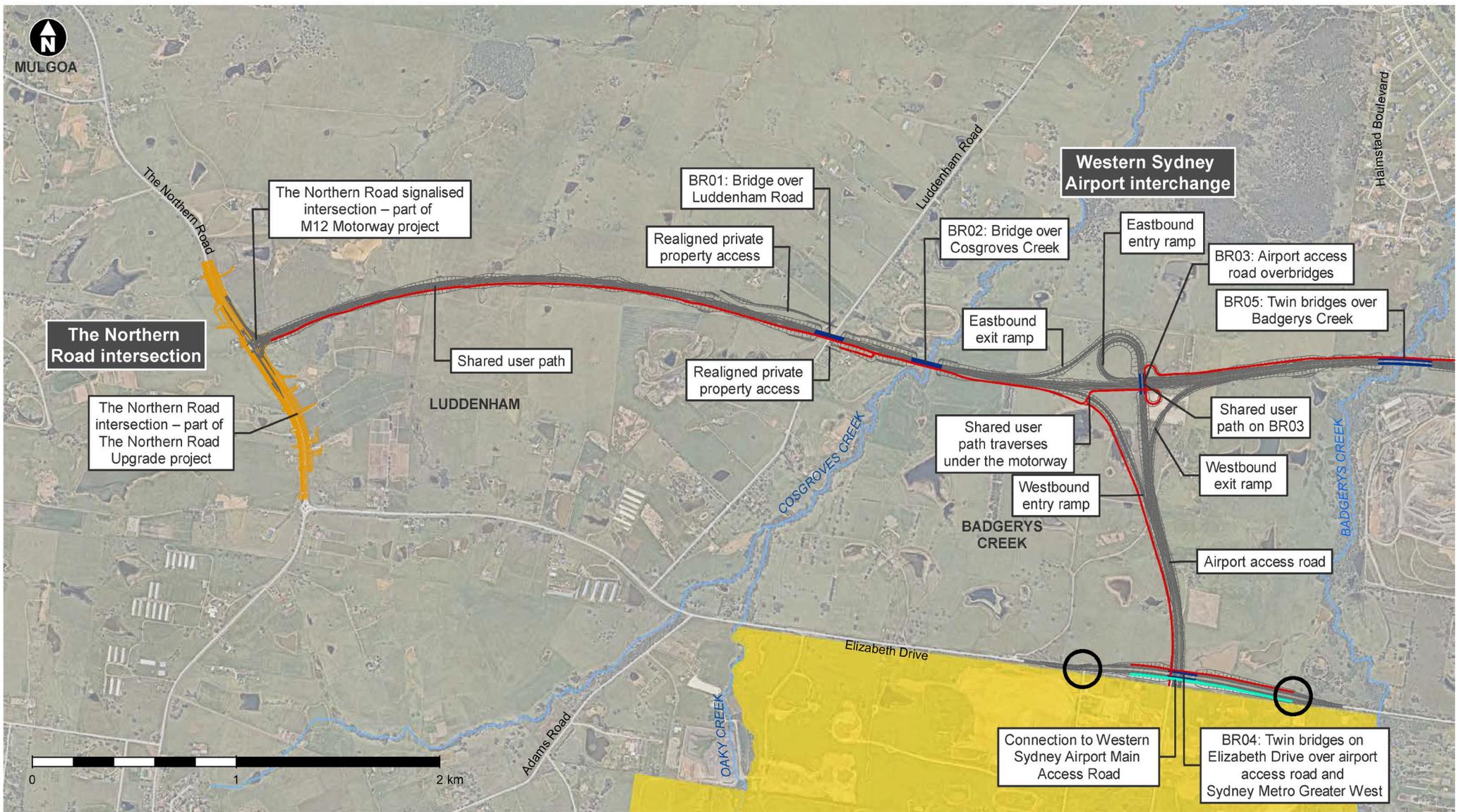


- The project
 - The Northern Road upgrade (currently under construction)
 - Motorway
 - Existing roads
 - Western Sydney Parklands
 - NPWS estate / reserve
 - Growth areas**
 - Western Sydney Priority Growth Area
 - South West Priority Growth Area
 - South West Growth Area
 - Western Sydney Aerotropolis
 - Western Sydney Employment Area
 - Western Sydney Airport
- Note. The roads within this zone are being removed as part of airport construction.



Figure 1-2 Project location – local context

Date: 18/07/2019 Path: J:\IE\Projects\04_Eastern\A145100\08_Spatial\GIS\Directory\Templates\MXDs\Figures\EIS\Chapters\Chapter1_Introduction\Final\EIS\JAJV_EIS_Chap1_F002_ProjectOverview_Local_r5v1.mxd Created by: HK | QA by: AA



- The project
- Part of The Northern Road upgrade project
- Shared user path
- Future shared user path (by others)

- Existing roads
- Waterways
- Bridges
- Western Sydney Airport
Note: The roads within this zone are being removed as part of airport construction.
- Potential future intersections (by others)
Note: Locations to be confirmed

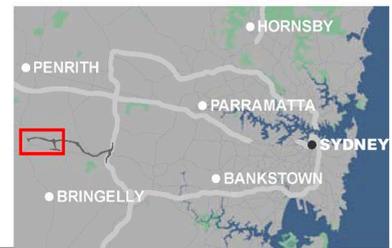
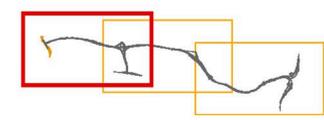
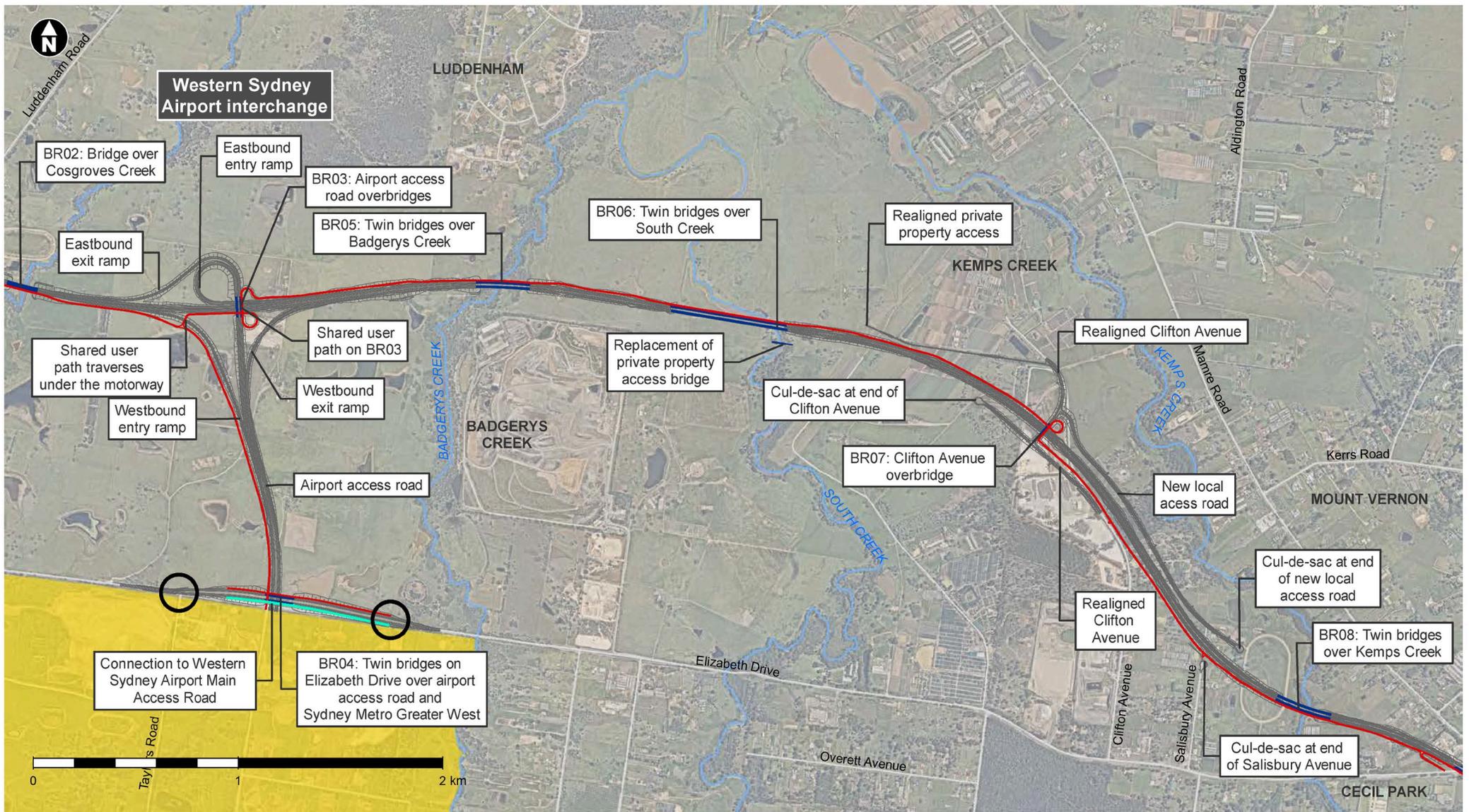


Figure 1-3 Project overview



- The project
- Part of The Northern Road upgrade project
- Shared user path
- Future shared user path (by others)

- Existing roads
- Waterways
- Bridges
- Potential future intersections (by others)
Note: Locations to be confirmed

■ Western Sydney Airport
Note. The roads within this zone are being removed as part of airport construction.

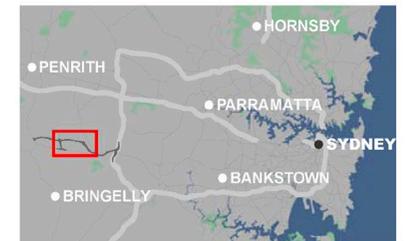
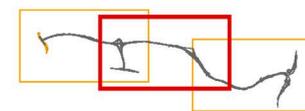
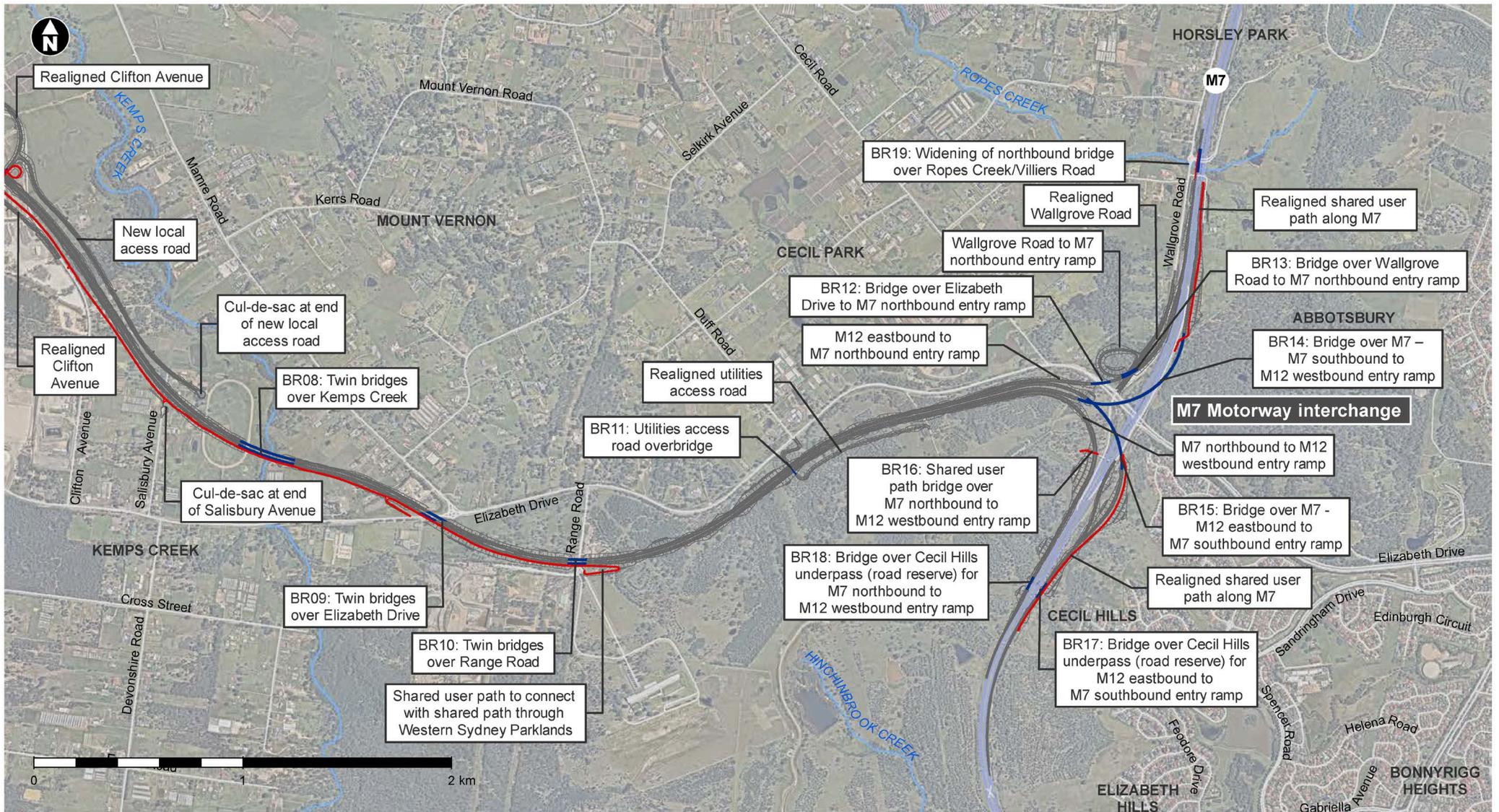


Figure 1-3 Project overview



- The project
- Part of The Northern Road upgrade project
- Shared user path
- Future shared user path (by others)
- Existing roads
- ~ Waterways
- Bridges

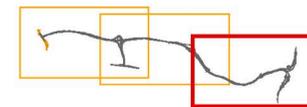


Figure 1-3 Project overview

The topography in and around the project footprint comprises rolling hills and small valleys between generally north–south ridge lines. Five major creeks traverse the project:

- Badgerys Creek
- Cosgroves Creek
- South Creek
- Kemps Creek
- Ropes Creek.

The existing land uses in and around the project include:

- Rural and agricultural uses including land used for grazing, intensive horticulture and animal production, and rural residential uses (further discussion on existing agricultural uses is in **Section 7.4.3**)
- Urban land uses including commercial and industrial uses, resource and waste facilities, community uses such as educational facilities and places of worship, recreation and parkland areas, and residential uses
- Environmental areas including conservation areas and watercourses and water infrastructure such as the Sydney Water Upper Canal at Cecil Park
- Roads and transport, including existing road corridors.

Generally, existing land uses near the project are characterised by large property rural and grazing land at Luddenham to the west, transitioning to a mix of intensive agriculture (horticulture and animal production) and resources at Kemps Creek, and rural residential, commercial and parkland in Mount Vernon and Cecil Hills in the east. The site of the Western Sydney Airport at Badgerys Creek is located to the south of Elizabeth Drive on land that was mainly used for agricultural (grazing) purposes.

1.3 Structure of this environmental impact statement

This EIS was prepared to address the requirements issued by the Secretary of the former NSW Department of Planning and Environment (DPE) (now NSW Department of Planning, Industry and Environment (DPIE)) and the relevant provisions of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (the EP&A Regulation).

The Secretary's Environmental Assessment Requirements (SEARs) were issued in July 2018 and re-issued on the 30 October 2018 to include requirements issued by the Commonwealth Department of Environment and Energy (DoEE) relating to potential impacts on matters of national environmental significance (MNES) protected under the EPBC Act (see **Appendix B**).

This EIS is divided into various volumes, described in **Table 1-1**.

Table 1-1 EIS volumes

Volumes	Contents
Volume 1 – Part A	<ul style="list-style-type: none"> • Introduction – provides a broad overview of the project and where it is located (Chapter 1) • Assessment process – outlines the statutory requirements and explains the steps in the assessment and approval process (Chapter 2) • Strategic justification and project need – provides the strategic context, explains the need for the project and identifies the project objectives (Chapter 3) • Project development and alternatives – reviews the alternatives and options considered in developing the project including the consequences of not proceeding (Chapter 4) • Project description – provides a detailed description of the project including the route alignment, design standards, key design features and construction methods (Chapter 5) • Consultation – outlines the consultation activities carried out, the issues raised and how these were addressed (Chapter 6)
Volume 1– Part B	<ul style="list-style-type: none"> • Assessment of key issues – identifies the key environmental issues, assesses the impacts and proposes environmental management measures (Chapter 7) <ul style="list-style-type: none"> – Biodiversity (Section 7.1) – Transport and traffic (Section 7.2) – Urban design, landscape character and visual amenity (Section 7.3) – Socioeconomic, land use and property (Section 7.4) – Aboriginal heritage (Section 7.5) – Non-Aboriginal heritage (Section 7.6)
Volume 1– Part C	<ul style="list-style-type: none"> • Assessment of key issues – identifies the key environmental issues, assesses the impacts and proposes environmental management measures (Chapter 7) <ul style="list-style-type: none"> – Noise and vibration (Section 7.7) – Flooding (Section 7.8) – Surface water quality and hydrology (Section 7.9) – Groundwater quality and hydrology (Section 7.10) • Assessment of other issues – identifies other environmental issues, assesses the impacts and proposes environmental management measures (Chapter 8)
Volume 1– Part D	<ul style="list-style-type: none"> • Summary of environmental management measures – collates all of the environmental management measures for the project identified through the impact assessment (Chapter 9) • Environmental risk analysis – details the risk analysis process by which the potential environmental issues for assessment were identified (Chapter 10) • Project justification and conclusion – presents the justification for the project, including consideration of the principles of ecologically sustainable development and the objects of the EP&A Act (Chapter 11) • References (Chapter 12) <p>Appendix A: Project synthesis</p> <p>Appendix B: Secretary’s environmental assessment requirements checklist</p> <p>Appendix C: Environmental Planning and Assessment Regulation 2000 (NSW), Part 3 of Schedule 2 checklist</p> <p>Appendix D: Schedule 4 of the Environment Protection and Biodiversity Conservation Regulations 2000 (Commonwealth) checklist</p>

Volumes	Contents
Volume 2 – Part A	Appendix E: Biodiversity assessment report – Main report and Annexures A, B and C
Volume 2 – Part B	Appendix E: Biodiversity assessment report – Annexures D to G
Volume 3	Appendix F: Transport and traffic assessment report
Volume 4	Appendix G: Landscape character, visual impact assessment and urban design report
Volume 5	Appendix H: Socio-economic, land use and property assessment report
Volume 6 – Part A	Appendix I: Aboriginal cultural heritage assessment report – Main report
Volume 6 – Part B	Appendix I: Aboriginal cultural heritage assessment report – Annexures
Volume 7	Appendix J: Non-Aboriginal heritage assessment report
Volume 8	Appendix K: Noise and vibration assessment report
Volume 9	Appendix L: Flooding assessment report Appendix M: Surface water quality and hydrology assessment report
Volume 10	Appendix N: Groundwater quality and hydrology assessment report Appendix O: Soils and contamination assessment report
Volume 11	Appendix P: Air quality assessment report Appendix Q: Environmental Record of Proponent

2. Assessment process

This chapter describes the planning approval process for the project as well as other relevant environmental planning and statutory approval requirements. **Table 2-1** outlines the SEARs, including the Commonwealth EIS Guidelines, as provided as an attachment to the SEARs.

Table 2-1 SEARs (assessment process)

Secretary's requirement	Where addressed
1. Environmental Impact Assessment Process	
1. The Environmental Impact Statement must be prepared in accordance with Part 3 of Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (the Regulation).	The approvals framework, discussion of the EP&A Act and the EP&A Regulation are provided in Section 2.1
2. The project will impact on matters of national environmental significance (MNES) protected under the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) and will be assessed in accordance with the NSW Bilateral Agreement (2015). The Proponent must assess the impacts on MNES protected under the EPBC Act. This assessment must be in accordance with the requirements listed in Attachment A.	MNES of relevance to the project are listed threatened species and communities (section 18 and 18A of the EPBC Act). Impacts are discussed in Section 7.1 Commonwealth legislative requirements are discussed in Section 2.2.2
3. The onus is on the Proponent to ensure legislative requirements relevant to the project are met.	Relevant NSW legislative requirements and how they are addressed are discussed in Section 2.1 and Section 2.1.1 Commonwealth legislative requirements are discussed in Section 2.2.2
2. Environmental Impact Statement	
1. The EIS must include, but not necessarily be limited to, the following:	
o. statutory context of the project as a whole, including:	Statutory context and approvals framework are discussed in Chapter 2 and Chapter 3
– how the project meets the provisions of the EP&A Act and EP&A Regulation	The provisions of the EP&A Act and EP&A Regulation are discussed Section 2.1.1 , Appendix C and Appendix D
– a list of any approvals that must be obtained under any other Act or law before the project may lawfully be carried out	NSW legislative approvals are discussed in Section 2.2.1 The relevance of Commonwealth approvals is discussed in Section 2.2.2

2.1 Approval framework

2.1.1 Environmental Planning and Assessment Act 1979

Roads and Maritime is seeking project approval for the proposed M12 Motorway under Division 5.2 of the EP&A Act.

Clause 94 of the State Environmental Planning Policy (Infrastructure) 2007 (Infrastructure SEPP) applies to development for the purpose of a road or road infrastructure facilities and provides that these types of works are development which is permissible without consent. The project is appropriately classified as being for the purpose of a “road” and a “road infrastructure facility” under the Infrastructure SEPP.

Clause 14 of the State Environmental Planning Policy (State and Regional Development) 2011 (State and Regional Development SEPP) declares development as State Significant Infrastructure (SSI) if it is permissible without consent and specified in Schedule 3.

Clause 1 of Schedule 3 of the State and Regional Development SEPP specifies that:

- (1) Infrastructure or other development that ... would be an activity for which the proponent is also the determining authority and would, in the opinion of the proponent, require an environmental impact statement to be obtained under Part 5 of the [EP&A] Act.*

Roads and Maritime formed the opinion that the project is likely to significantly affect the environment and would require an EIS to be prepared. Consequently, the project is SSI under Division 5.2 of the EP&A Act.

Under section 5.13 of the EP&A Act, the Minister for Planning and Public Spaces may declare SSI to be critical SSI if he forms the opinion that the SSI is essential for the State for economic, environmental or social reasons. If the declaration is made the project would be listed under schedule 5 of the State and Regional Development SEPP, pursuant to clause 16 of that SEPP. The Minister for Planning and Public Spaces has declared the project as critical state significant infrastructure (CSSI).

In May 2018, Roads and Maritime submitted an application under Section 5.15 of the EP&A Act to the Secretary of DPIE to carry out the project.

On 12 July 2018, the Secretary of DPIE issued the SEARs for the project to Roads and Maritime. The SEARs identify the assessment requirements for the project. The SEARs were then revised on 30 October 2018 to reflect the decision that the project is a controlled action under the EPBC Act. This is discussed further in **Section 2.2.2**. A copy of the revised SEARs and an indication of where each requirement is addressed in the EIS is provided in **Appendix B**. These are also summarised at the start of each chapter.

The EIS was prepared in accordance with the SEARs issued on 30 October 2018 and Part 3 of Schedule 2 of the EP&A Regulation. The EIS complies with the General Provisions outlined in Part 3, such as the key content requirements. This includes the project description, alternative options, likely environmental impacts and mitigation measures, and relevant environmental planning approvals and permits. **Appendix C** outlines where each relevant environmental element listed in the EP&A Regulation is discussed within the EIS.

This EIS must be publicly exhibited for at least 28 days, during which time any person (including a public authority) may make a written submission to the Secretary. Once the exhibition period has ended, the Secretary is to provide copies of submissions received or a report of the issues raised in the submissions to Roads and Maritime and any other public authority the Secretary considers appropriate. The Secretary may then require Roads and Maritime to submit a response to the issues raised in the Submissions Report and Preferred Infrastructure Report (PIR) outlining any proposed changes to the project to further minimise its environmental impact or to deal with any other issues raised during the assessment of the project.

The approval process under Part 5, Division 5.2 of the EP&A Act is illustrated in **Figure 2-1**. Further information on the assessment process is available on the DPIE website (www.planning.nsw.gov.au).

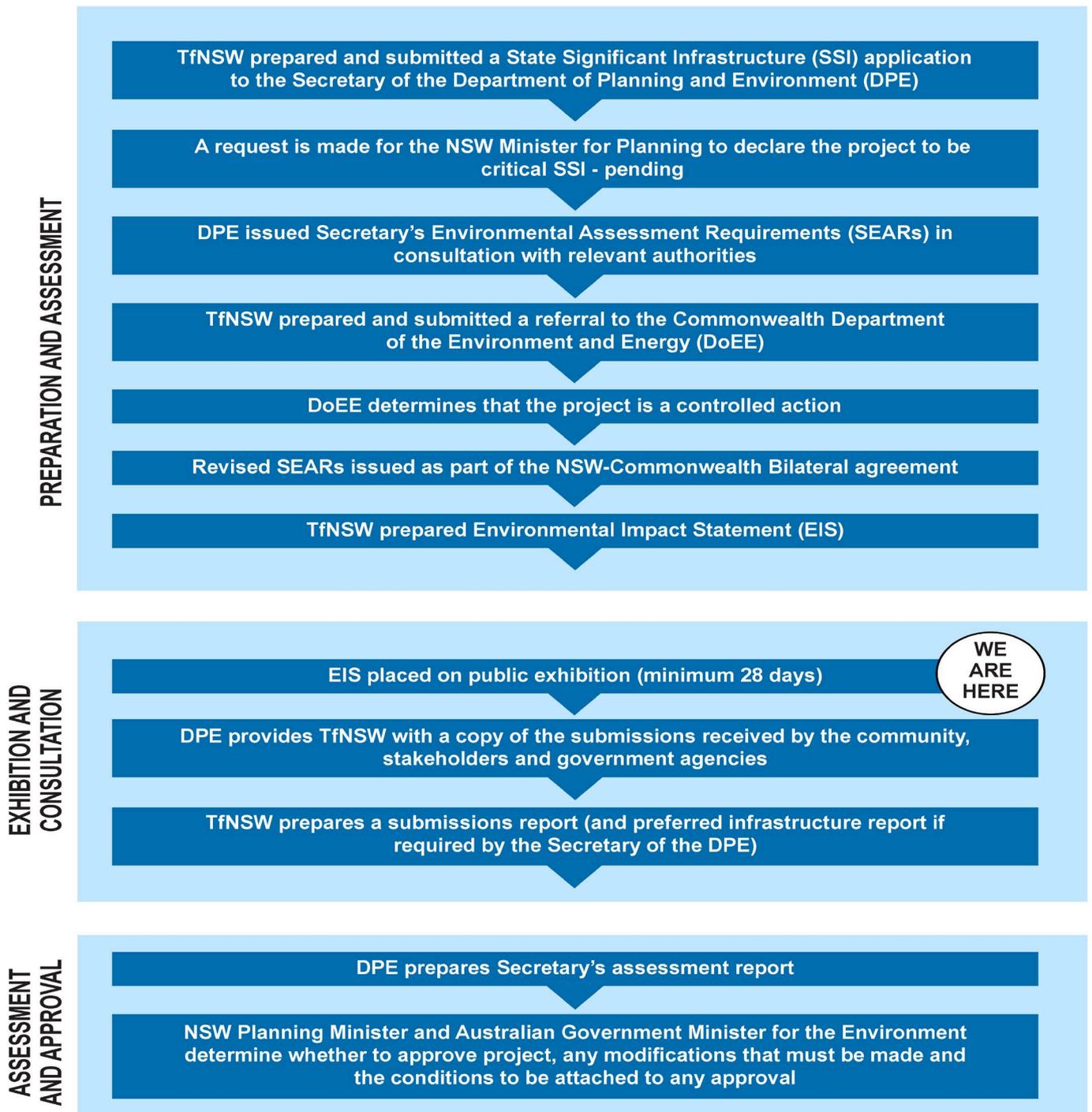


Figure 2-1 Approvals process under Part 5, Division 5.2 of the EP&A Act

2.2 Other legislation

2.2.1 NSW legislation

Approvals not required for the project

A number of approvals are not required for a project approved under Part 5, Division 5.2 of the EP&A Act (EP&A Act s.5.23). Those approvals not required for the project are:

- Permits under sections 201, 205 and 219 of the *Fisheries Management Act 1994* (FM Act)
- Approvals under Part 4 and excavation permits under section 139 of the *Heritage Act 1977* (Heritage Act)
- Aboriginal heritage permits under section 90 of the *National Parks and Wildlife Act 1974* (NPW Act)
- Authorisation referred to in section 12 of the *Native Vegetation Act 2003* (or under any Act repealed by that Act) to clear native vegetation or State protected land
- Various approvals under the *Water Management Act 2000*, including water use approvals under section 89, water management work approvals under section 90, and activity approvals (other than aquifer interference approvals) under section 91.

Section 5.23(2) of Division 5.2 of the EP&A Act precludes the following being made to prevent or interfere with the carrying out of the project once approved:

- Order restricting harm to buildings, works, relics or places that are not the subject of an interim heritage order or listing under the State Heritage Register under Division 8 of Part 6 of the Heritage Act
- If the project is declared CSSI, section 5.23(3) of Division 5.2 of the EP&A Act precludes the following being made to prevent or interfere with the carrying out of the project once approved:
- Interim protection order within the meaning of the NPW Act
- Order or direction under Part 11 of the *Biodiversity Conservation Act 2016* (BC Act)
- Order under Division 1 (Stop work orders) of Part 6A of the NPW Act, or Division 7 (Stop work orders) of Part 7A of the FM Act
- Remediation direction under Division 3 of Part 6A of the NPW Act
- Environmental protection notice under Chapter 4 of the *Protection of the Environment Operations Act 1997* (POEO Act)
- Order from a council to demolish or move a building, to repair or make structural alterations to a building, or to do or refrain from doing things under section 124 of the *Local Government Act 1999*.

Approvals that may apply to the project

Approvals under other NSW legislation that may apply to the project include:

- Written approval under section 110a of the *Protection of the Environment Operations (Waste) Regulation 2014* (POEO Regulation) for any excavations on former landfill sites
- Written notice of the proposed dredging or reclamation work to the Minister under section 199 of the FM Act.

Legislation that would apply to the project

NSW Legislation that would apply to the project is detailed in **Table 2-2**. Under section 5.24 of the EP&A Act, certain statutory approvals cannot be refused and must be issued substantially, consistent with the SSI approval, including an Environment Protection Licence under the POEO Act.

Table 2-2 NSW legislation applicable to the project

NSW legislation	Relevance to the project
<i>Threatened Species Conservation Act 1995</i> (TSC Act) and <i>Biodiversity Conservation Act 2016</i> (BC Act)	<p>Prior to August 2017, the TSC Act provided for the protection of biodiversity, including requirements for the protection of threatened species, populations and ecological communities. The TSC Act was repealed and replaced by the BC Act on 25 August 2017.</p> <p>The NSW Government established transitional arrangements for biodiversity assessment for the various categories of development consent or approvals that are underway or have already been made. These transitional arrangements are defined in the Biodiversity Conservation (Savings and Transitional) Regulation 2017. On 5 April 2018, DPIE confirmed the project is considered a “pending or interim planning application” as the environmental assessment for the project had been substantially begun. As such, the TSC Act would still apply to the project under the transitional arrangements in accordance with Part 7 of the Regulation.</p> <p>Land clearing, threatened species, and biodiversity offsetting are further discussed in Section 7.1.</p>
<i>Fisheries management Act 1994</i> (FM Act)	Notification to the Minister if dredging or reclamation are required under section 199 of the FM Act.
<i>Protection of the Environment Operations Act 1997</i> (POEO Act)	<p>An environmental protection licence for road construction is required as per Schedule 1 of the POEO Act.</p> <p>In accordance with section 5.24 of the EP&A Act, such a licence cannot be refused for an approved project and is to be substantially consistent with the Division 5.2 approval.</p>
<i>Land Acquisition (Just Terms Compensation) Act 1991</i> (Land Acquisition Act)	<p>The Land Acquisition Act relates to acquisition of land by State authorities.</p> <p>Under section 20 of the Act, any land compulsory acquired would be ‘freed and discharged from all estates, interests, trusts, restrictions, dedications, reservations, easements, rights, charges, rates and contracts in, over or in connection with the land’.</p> <p>Acquisitions are further discussed in Section 5.23.</p>
<i>Contaminated Land Management Act 1997</i> (CLM Act)	The CLM Act outlines the circumstances in which notification of the NSW Environment Protection Authority (EPA) is required in relation to the contamination of land. Contaminated land is further discussed in Section 8.1 .
<i>Western Sydney Parklands Act 2006</i> (WSP Act)	The WSP Act applies to the land located within the Western Sydney Parklands and establishes certain land to be Trust Land. Trust Land affected by the project would be subject to the Land Acquisition Act. Where relevant, the Western Sydney Parklands were considered throughout Chapter 7 and Chapter 8 .

2.2.2 Commonwealth legislation

Environment Protection and Biodiversity Conservation Act 1999

Under the EPBC Act, if a proposed action has the potential to significantly impact on matters of national environmental significance (MNES) or the environment of Commonwealth land, or if the action is being carried out by a Commonwealth agency, it must be referred to the Australian Government. If the Australian Minister for the Environment determines that a referred project is a “controlled action”, the approval of that Minister would be required for the project as well as approval from the NSW Minister for Planning and Public Spaces.

This project was referred to the DoEE on 27 August 2018 due to the potential for the project to impact on MNES listed under the EPBC Act.

On 19 October 2018, the delegate for the Australian Minister for the Environment confirmed the project would be a controlled action under section 75 of the EPBC Act. MNES of relevance to the project were listed threatened species and communities (section 18 and 18A of the EPBC Act). As such, the project requires assessment and approval under the EPBC Act.

The DoEE determined the project's controlled action status based on its potential to impact on the following MNES:

- Cumberland Plain Shale Woodlands and Shale-Gravel Transition Forest (CPW) – critically endangered ecological community
- Sydney Bush Pea – *Pultenaea parviflora* – listed as vulnerable
- Grey-headed Flying-fox – *Pteropus poliocephalus* – listed as vulnerable
- Koala – *Phascolarctos cinereus* – listed as vulnerable in QLD, NSW and ACT
- Swift Parrot – *Lathamus discolor* – listed as critically endangered.

In addition, the DoEE required this EIS to assess the potential impact on a further 13 ecological communities or threatened species listed under the EPBC Act.

The NSW Government confirmed the action will be assessed under the “Bilateral agreement made under section 45 of the EPBC Act relating to environmental assessment between Commonwealth of Australia and the State of New South Wales” (Bilateral Agreement) (2015). This agreement accredits the assessment process under Division 5.2 of the EP&A Act. The Australian Minister for the Environment would then need to issue a separate approval for the project.

In October 2018, the SEARs were revised to reflect the project being a controlled action (**Appendix B**). This EIS was prepared to address the specific matters raised in the revised SEARs.

While the project would impact some parcels of land currently in Commonwealth ownership near Elizabeth Drive, this land would be transferred to Roads and Maritime prior to approval of the project. As such the land was considered as state owned for the purposes of this EIS. Indirect impacts on adjacent Commonwealth land was considered throughout the EIS.

Airports Act 1996

The *Airports Act 1996* (Airports Act) establishes the regulatory arrangements which apply to airports, including the Western Sydney Airport. As discussed in **Section 1.1** and **Section 3.2**, the project is required to support the opening of the Western Sydney Airport by connecting Sydney's motorway network to the airport.

The ***Western Sydney Airport: Airport Plan*** (Commonwealth of Australia, 2016) was prepared under Division 4A of Part 5 of the Airports Act during the Stage 1 development of the Western Sydney Airport. The Western Sydney Airport was approved as part of the determination of the Western Sydney Airport Plan on 12 December 2016 by the then Minister for Urban Infrastructure.

The Airport Plan states that the main access to the airport site would be via a link to the M12 Motorway. Section 3.6.2 of the Plan details the proposed public access via the project. If tie-in work is required at the Airport Access Road on Commonwealth land, it would be carried out under the Airport Plan and in consultation with Western Sydney Airport (WSA Co).

In addition, the Airports (Protection of Airspace) Regulations (REG 16A) sets out exemptions for controlled activities carried out at the Western Sydney Airport that would otherwise require an approval under the Airports Act. The project meets the requirements for an exemption and therefore no approval would be required under the Airports Act. Roads and Maritime has held discussions with Department of Infrastructure, Transport, Cities and Regional Development (DITCRD), WSA Co and AirServices Australia to ensure future prescribed airspace requirements are considered in the project design.

3. Strategic justification and project need

This chapter outlines the relationship of the project to the strategic planning framework. It also identifies the need for the project and the project objectives. It concludes with a statement of strategic need.

Table 3-1 sets out the SEARs that relate to the strategic context and need for the project and identifies where these SEARs are addressed in this EIS.

Table 3-1 SEARs (strategic justification and project need)

Secretary's requirement	Where addressed
2. Environment Impact Statement	
1. The EIS must include, but not necessarily be limited to, the following:	
c. a statement of the objective(s) of the project	The primary program objectives of WSIP are provided in Section 3.3.1 The specific project objectives for the M12 Motorway based on the broader WSIP objectives are provided in Section 3.3.2
d. a summary of the strategic need for the project with regard to its critical State significance and relevant State Government policy	The strategic need for the project with relevance to NSW and Australian strategic planning and policy framework is discussed throughout Chapter 3 An overall statement of strategic need is provided in Section 3.4

3.1 NSW and Australian strategic planning and policy framework

This section describes the strategic justification for the project, considering the consistency of the project with key strategic planning and policy documents.

3.1.1 NSW State Priorities 2015–2019

There are 18 State priorities being actioned by the NSW Government to grow the economy, deliver infrastructure, protect the vulnerable, and improve health, education and public services across NSW. The project would help achieve the following three **NSW Priorities** (NSW Government 2015):

- Building infrastructure – by constructing a new motorway
- Reducing road fatalities – by reducing the potential for traffic incidents through the provision of a controlled access motorway
- Improving road travel reliability – by providing a new motorway that would increase capacity between The Northern Road and the M7 Motorway to accommodate future traffic demand, reduce areas of congestion, improve travel times, and build extra road capacity.

3.1.2 NSW Premier's Priorities

There are 15 priorities that represent the NSW Government commitment to making a significant difference to enhance the quality of life of the people of NSW. The project would help achieve the following two **Premier's Priorities**:

- **Better Environment: Greener public spaces** – by facilitating access in Western Sydney which facilitates growth in Western Sydney including areas around Western Sydney Parklands and providing access to Western Sydney Parklands
- **Better Environment: Greening our city** – by contributing to an increase in tree canopy in western Sydney.

3.1.3 NSW State Infrastructure Strategy

The NSW **State Infrastructure Strategy**, developed by Infrastructure NSW (2018), is a 20-year strategy to build on the NSW Government's major long-term infrastructure plans over the last seven years and set out the government's infrastructure priorities for the next 20 years.

The State Infrastructure Strategy identifies a number of key actions to connect people and places, including to “partner with the Australian Government to plan for Sydney's Western Parkland City; and the Western Sydney Airport and associated transport links, including the motorway link to the airport” (Infrastructure NSW, 2018). The project would directly address and support this key action by creating a motorway link to the Western Sydney Airport.

3.1.4 Infrastructure Australia priority projects

The **Infrastructure Priority List** (Infrastructure Australia, 2019) sets out nationally significant investments that are considered to be priority projects over the next 15 years. The February 2019 issue of the Infrastructure Priority List identifies the Western Sydney Airport as a high priority project that addresses a major problem or opportunity of national significance. The M12 Motorway project would directly support this high priority project by creating a motorway link to the Western Sydney Airport.

The Infrastructure Priority List also includes the WSIP as a priority initiative, the M12 Motorway is listed as part of this initiative. The applicability of the WSIP to the project is discussed in **Section 3.1.7**.

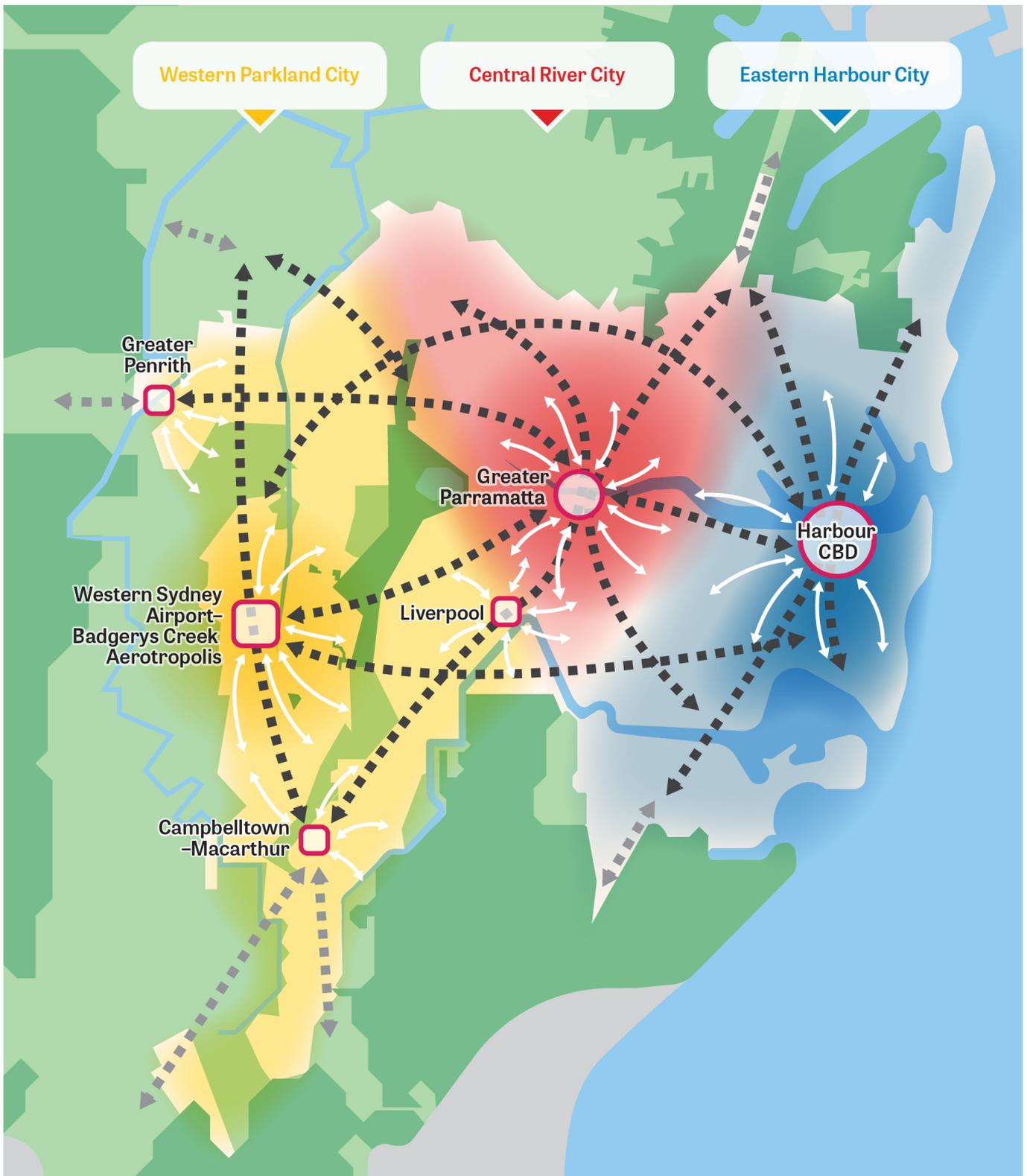
3.1.5 Greater Sydney Region Plan

The Greater Sydney Commission (GSC) aims to make the Greater Sydney area more productive, sustainable and liveable. In June 2018, the GSC identified the leading strategic planning priorities for Greater Sydney, including implementation of the **Greater Sydney Region Plan, A Metropolis of Three Cities (Greater Sydney Region Plan)** (GSC, 2018a).

The Greater Sydney Region Plan identifies three connected cities (see **Figure 3-1**) within the Greater Sydney area as follows:

- Western Parkland City
- Central River City
- Eastern Harbour City.

The M12 Motorway would be located within the Western Parkland City. The project would directly address and support Objective 20 of the Greater Sydney Region Plan, which identifies the Western Sydney Airport and the surrounding business zone as an economic catalyst for the Western Parkland City. The M12 Motorway would be a key section of road infrastructure that would help connect the Western Parkland City to the Greater Sydney motorway network.



Source: (Greater Sydney Commission, 2018a)

Figure 3-1 Greater Sydney Region Plan

The ***Western City District Plan*** (GSC, 2018b) sets out planning priorities and actions for improving the quality of life for residents in western Sydney. The Western City stretches from Richmond-Windsor and Rouse Hill in the north to Campbelltown-Macarthur in the south.

The key focus of the Western City District Plan is for residents to have quicker and easier access to a wider range of jobs, housing types and activities. This would be facilitated through a range of infrastructure commitments including the Western Sydney Airport, Sydney Metro extensions and major road and motorway network expansions.

The Western Sydney Airport is centred within an economic corridor that runs north–south within the Western Parkland City. The economic corridor follows the alignment of the first stage of the committed North South Rail Link from St Marys to the Western Sydney Airport and Western Sydney Aerotropolis. These infrastructure projects would result in a significant change and transformation from currently peri-urban land that is primarily agricultural into mixed urban uses associated with the Western Parkland City.

The project would directly address and support Planning Priority W1, W7 and W8 within the Western City District Plan, by providing infrastructure which aligns with forecast growth and providing transport links that would service employment areas in western Sydney. The objectives for the relevant Planning Priorities are listed out in **Table 3-2**.

Table 3-2 Planning objectives of the Western City District Plan

Objectives	How the project meets objective
W1 – Planning for a city supported by infrastructure	
Objective 1 – Infrastructure supports the three cities	The project would provide the necessary infrastructure to support the Western Parkland City, and would provide connections to other supporting infrastructure
Objective 2 – Infrastructure aligns with forecast growth – growth infrastructure compact	The design of the project incorporates the forecast growth of the Western Parkland City and surrounds
Objective 3 – Infrastructure adapts to meet future needs	The design of the project allows for future incorporation of future infrastructure and allows for the construction of extra traffic lanes to meet future needs
Objective 4 – Infrastructure use is optimised	The project would better serve the fragmented land use patterns across Greater Sydney by supporting efficient transport connections for trips that are not well-served by other transport modes due to uneven or fragmented economic or residential development.
W7 – Establishing the land use and transport structure to deliver a liveable, productive and sustainable Western Parkland City	
Objective 14 – A Metropolis of Three Cities – integrated land use and transport creates walkable and 30-minute cities	The project that will reinforce the metropolis of three cities by providing an efficient east-west link to allow residents to live within 30 minutes of their jobs, education, health facilities and services.
Objective 15 – The Eastern GOP and Western Economic Corridors are better connected and more competitive	The project would deliver a new east-west link to support development opportunities in the Western Economic Corridor arising from the Western Sydney Airport.
Objective 16 – Freight and logistics network is competitive and efficient	The project would be the primary motorway access to the Western Sydney Airport and its precincts, enabling people to access commercial, passenger and freight precincts by road and providing for the essential airport operations to occur.
Objective 17 – Regional connectivity is enhanced	The project would deliver a key element of the Western City Infrastructure Plan by offering a new east-west link. The project would have positive impacts on regional and national business and industry through improved access and connectivity to growth areas in western Sydney and the Greater Sydney area.

Objectives	How the project meets objective
W8 – Leveraging industry opportunities from the Western Sydney Airport and Badgerys Creek Aerotropolis	
Objective 20 – Western Sydney Airport and Badgerys Creek Aerotropolis are economic catalysts for Western Parkland City	The project would support and maintain Western Sydney Airport and Western Sydney Aerotropolis as the catalyst for economic growth in western Sydney by providing a high-speed motorway standard access from the Sydney Motorway network at the M7 Motorway and the arterial road network at The Northern Road.
Objective 24 – Economic sectors are targeted for success	The project would contribute to providing access to the Western Sydney Airport and the Western Sydney Aerotropolis as well as the metropolitan centres of Penrith, Liverpool and Campbelltown, allowing access to business opportunities and jobs

3.1.6 Western Sydney Aerotropolis Land Use and Infrastructure Implementation Plan

The *Western Sydney Aerotropolis Land Use and Infrastructure Implementation Plan* (DPE, 2018a) applies to the Western Sydney Aerotropolis, the area surrounding the Western Sydney Airport that was previously known as the Western Sydney Airport Growth Area, as shown in **Figure 3-2** (DPE, 2019). The Aerotropolis would establish a new high-skill jobs hub for aerospace and defence, manufacturing, healthcare, freight and logistics, agribusiness, education and research industries. It is expected to contribute to establishing 200,000 new jobs for western Sydney (DPE, 2018a).

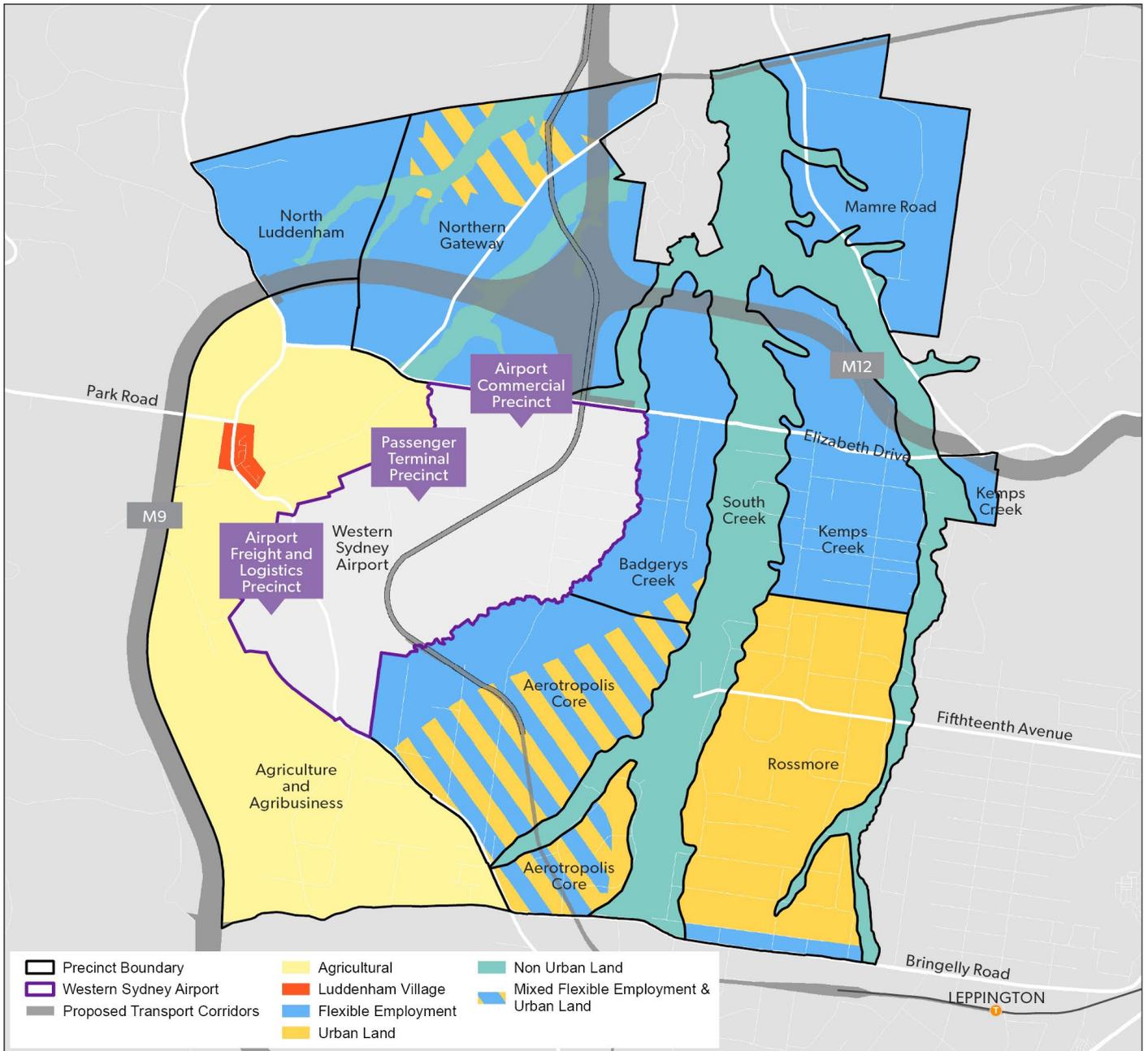
The plan defines how the Aerotropolis will be created, and how its precincts will integrate with growth areas and be consistent with the Greater Sydney Region Plan (discussed in **Section 3.1.5**).

The project is planned to provide a key connection from the M7 Motorway to the future planned Outer Sydney Orbital (OSO) and provide access to the northern entrance of the Western Sydney Airport. The project would be the primary motorway access to the Western Sydney Airport and the nine precincts that make up the Aerotropolis.

The nine precincts that make up the Aerotropolis comprise a mix of land uses including employment and business, airport related industries, mixed use, residential/urban land use and significant open space corridors along the primary drainage corridors, notably South Creek. The M12 Motorway alignment intersects the northern precincts, which include Kemps Creek, South Creek, Badgerys Creek, Northern gateway and North Luddenham. These precincts are intended to evolve from existing agricultural land uses to primarily employment-oriented land uses as the Aerotropolis is developed.

The M12 Motorway is listed as ‘committed transport infrastructure’ under this plan and would connect the Aerotropolis to the Western Sydney Airport and the rest of western Sydney. The project would enable jobs in the Aerotropolis to be easily accessible.

The policy drivers of the plan, and how the project fulfils them are presented in **Table 3-3**, overleaf.



Source: (DPE, 2019)

Figure 3-2 Western Sydney Aerotropolis

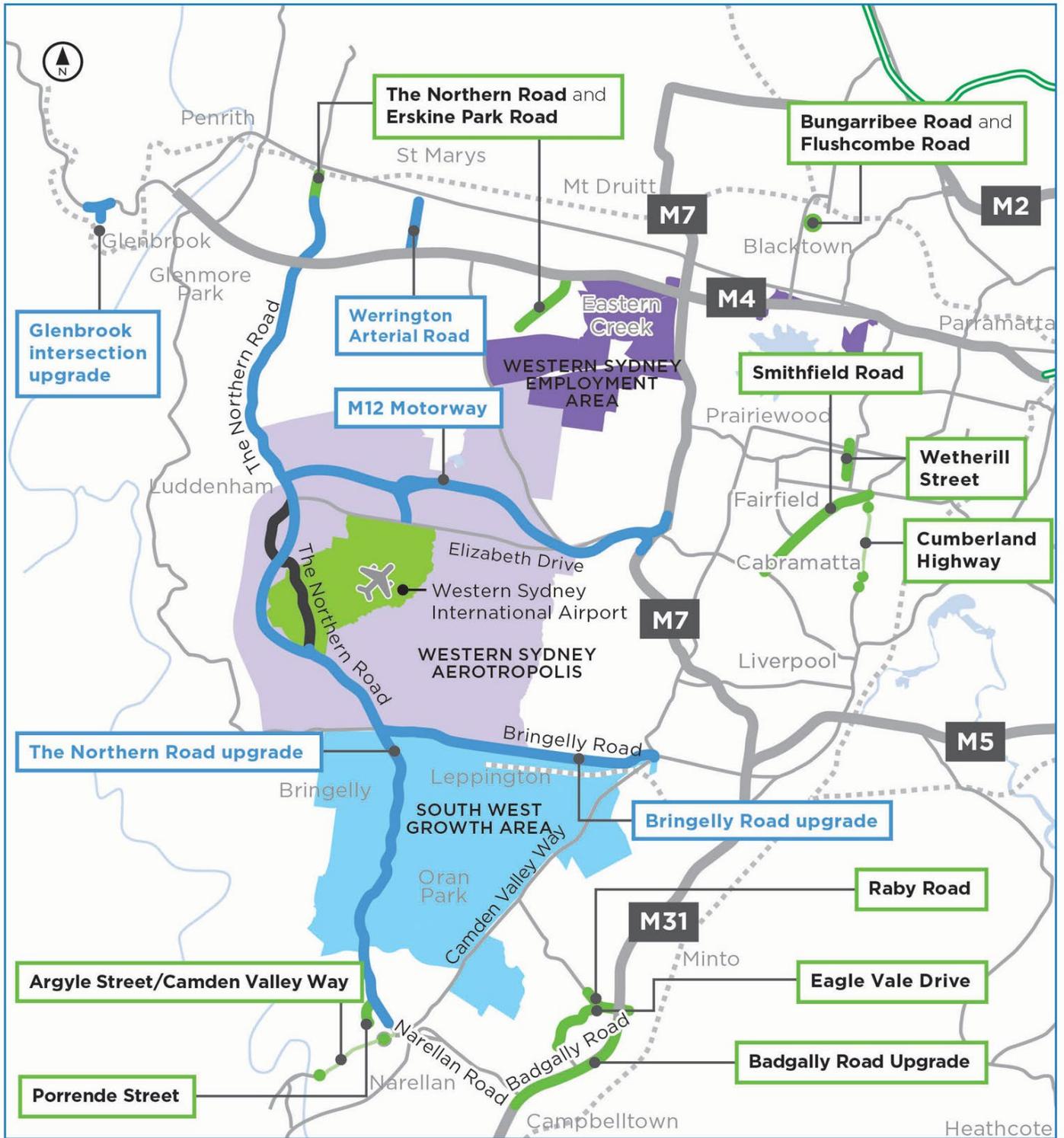
Table 3-3 Policy drivers of the Western Sydney Aerotropolis Land Use and Infrastructure Plan

Policy driver	How the project fulfils the policy driver
Airport operations, including: <ul style="list-style-type: none"> • The Airport Commercial Precinct • The Passenger Terminal Precinct • The Airport Freight and Logistics Precinct 	The project would be the primary motorway access to the Western Sydney Airport and its precincts, enabling people to access commercial, passenger and freight precincts by road and providing for the essential airport operations to occur.
Connect infrastructure to the Aerotropolis, including <ul style="list-style-type: none"> • Public transport • Road connections • Freight requirements 	The project would be the primary road connection to the Aerotropolis. In addition, bus services and freight transport would use the project to access the aerotropolis.
A sustainable, liveable and green Aerotropolis, including: <ul style="list-style-type: none"> • Water smart planning in the South Creek catchment • Contemporary, liveable neighbourhoods • A culture of arts and creativity • Environmental conservation in the Cumberland Plain • Clean, reliable, affordable modern energy infrastructure 	The project has been designed in accordance with relevant sustainability themes and objectives. Sustainability outcomes would be largely achieved within future stages of the project. Specifically, the project has been designed to: <ul style="list-style-type: none"> • Minimise impacts to the South Creek catchment • Create a distinctly unique and memorable piece of infrastructure that establishes the gateway to western Sydney • Where practicable, minimise impacts to biodiversity.

3.1.7 Western Sydney Infrastructure Plan

The M12 Motorway forms a key part of the ***Western Sydney Infrastructure Plan*** (WSIP) (Roads and Maritime, 2016a). The WSIP is a joint initiative of the Australian and NSW governments to fund a \$4.1 billion road and transport linkages investment program for western Sydney (see **Figure 3-3**). The WSIP will:

- Deliver major road infrastructure upgrades to support an integrated transport solution for the western Sydney region that will improve connections within western Sydney and benefit the region's growing population, by reducing travel times
- Support and capitalise on the economic benefits of developing the Western Sydney Airport
 - The airport will be transformational for western Sydney and be a catalyst for investment, growth and job creation for decades to come
 - The airport will need to be supported by a high-quality surface transport network to ensure the efficient movement of people and freight
 - Improve road transport capacity ahead of future traffic demand generated by planned residential and employment development in the South West Growth Area, Western Sydney Employment Area and the Aerotropolis
 - The project would contribute to the provision of better road linkages within the western Sydney region and benefit the region's growing population by reducing commuting times.



Source: (Roads and Maritime, 2019)

Figure 3-3 Western Sydney Infrastructure Plan overview map

In addition to the project, there are four main projects included in the WSIP. The projects include the construction of new roads and significant upgrade of other roads, as follows:

- The Northern Road upgrade between Narellan and Penrith
- Bringelly Road upgrade between Camden Valley Way, Leppington and The Northern Road, Bringelly
- Werrington Arterial Road Stage 1
- A \$200 million package for local road upgrades across western Sydney, to be managed by local councils.

3.1.8 Western Sydney Parklands Plan of Management 2030

The *Western Sydney Parklands Plan of Management 2030* (Parklands Plan) (Western Sydney Parklands Trust [WSPT], 2018a) provides a strategic management framework for the Parklands and assists the Western Sydney Parklands Trust in determining future actions and priorities. The project would support the following objectives of the Parklands Plan:

- Improve access to the Parklands, including by designing the connections to the existing and future shared user paths for the Parklands
- Allow for new infrastructure/utilities and achieve a balance between the recreation and aesthetic values of the Parklands and the infrastructure needs of external agencies.

The route selection process for the project considered the Parkland Plan (as documented in **Chapter 4**).

The *Southern Parklands Framework* (WSPT, 2018b) is part of the overall planning framework for the Western Sydney Parklands and seeks to create unique destinations that enhance park identity, promote active living and wellness, and improve amenity for local residents. The M12 Motorway alignment was considered within the Southern Parklands Framework.

3.1.9 Future Transport Strategy 2056

The *Future Transport Strategy 2056* (NSW Government, 2018a) is an update of NSW's Long-Term Transport Master Plan. The Strategy outlines a vision, strategic directions and customer outcomes, with infrastructure and services plans underpinning the delivery of these directions across the State.

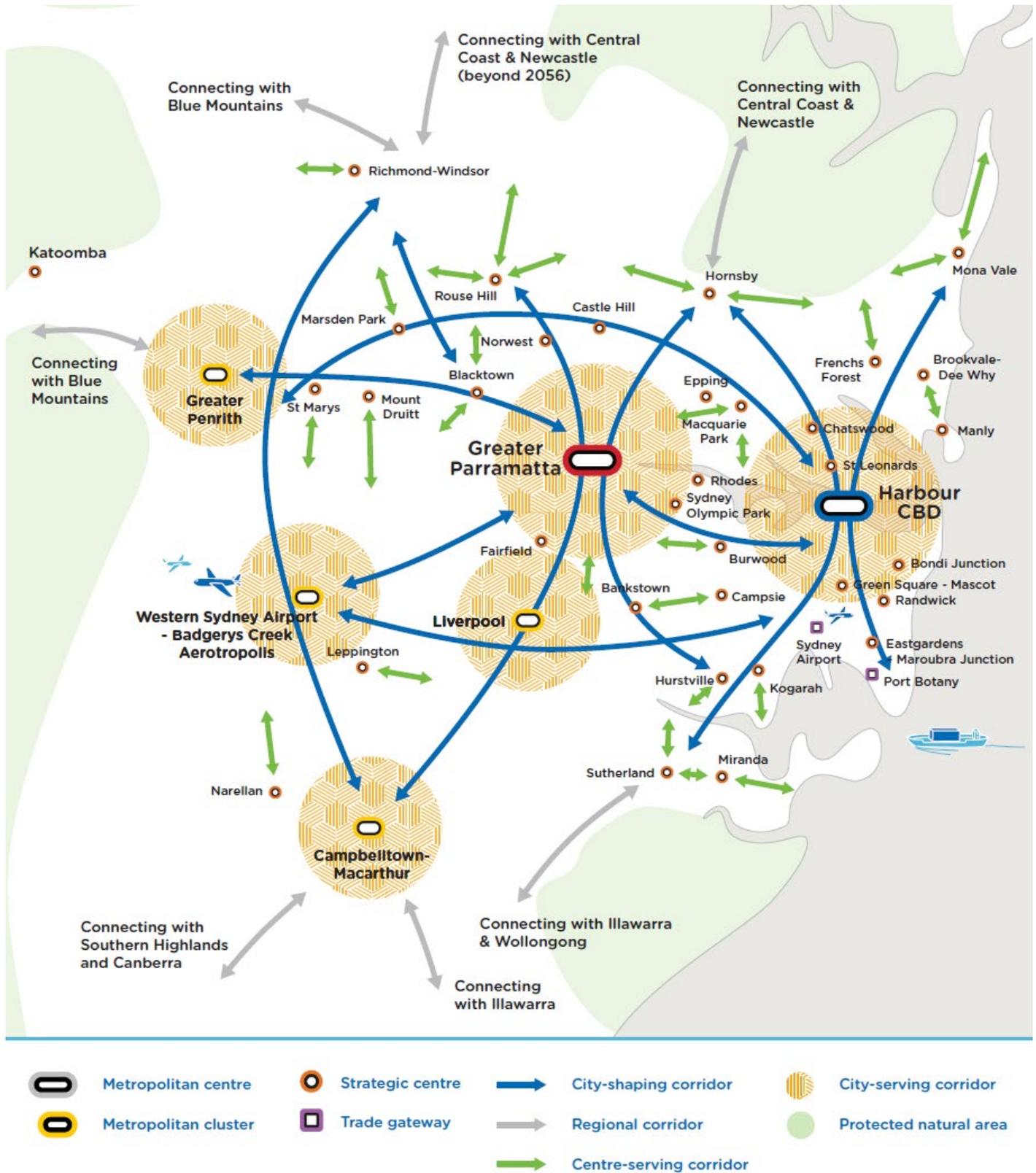
The Future Transport Strategy sets the 40-year vision, directions and outcomes framework for customer mobility in NSW, which will guide transport investment over the longer term. Strategic transport corridors identified in the strategy are shown in **Figure 3-4**.

The project is identified in the Strategy as a committed initiative for the next 0-10 years as part of the WSIP.

3.1.10 National Road Safety Strategy 2011–2020

The *National Road Safety Strategy 2011–2020* aims to identify initiatives to improve the safety of Australia's roads (Australian Transport Council, 2011). The strategy aims to reduce the annual number of road crash fatalities and serious road crash injuries by at least 30 per cent by the end of 2020.

The project would provide the opportunity to reduce crashes, as it would be a high standard road that would minimise the number of intersections encountered when travelling through the project area. By improving road safety, the project would directly support the aims of the National Road Safety Strategy 2011–2020.



Source: *Future Transport 2056 (Transport for NSW (TfNSW), 2018)*

Figure 3-4 Greater Sydney strategic transport corridors

3.1.11 NSW Key Freight Routes Road Expenditure and Investment Plan

The ***NSW Key Freight Routes Road Expenditure and Investment Plan*** (Transport and Infrastructure Council, 2016) provides an integrated strategy to guide transport investments over the longer term, assisting with the movement of goods in an efficient, safe and environmentally sustainable manner.

The project is identified in the plan (referred to as the 'Western Sydney Airport Motorway, M7 – The Northern Road') as providing freight access to the Western Sydney Airport. The project would satisfy the need for a freight route to the Western Sydney Airport.

3.1.12 NSW Bike Plan

The ***NSW Bike Plan*** (Bicycle NSW, 2010) aims to make NSW one of the world's best places to ride a bike by outlining how the NSW Government will work in partnership with local councils, communities and businesses to grow bike riding over 10 years to 2020.

As discussed in **Section 5.21**, the project would provide a shared user path between The Northern Road and the Western Sydney Parklands, including a connection to the Western Sydney Airport. The shared user path would connect to the existing path along the M7 Motorway, and to the future shared user path along The Northern Road. The section of the path through the Western Sydney Parklands would be developed by the Western Sydney Parklands Trust in consultation with Roads and Maritime. In the event that the shared user path connection through Western Sydney Parklands does not proceed, Roads and Maritime would extend the M12 Motorway shared user path from Range Road to the M7 Motorway shared user path along either Elizabeth Drive or the M12 Motorway (instead of through the Parklands).

The project would directly support the following actions in the NSW Bike Plan:

- 2.16 – Provide shared pedestrian and cycle off-road facilities in all appropriate locations as part of State Road projects in the Greater Metropolitan Region
- 2.21 c. – Maintain programs that enable the upgrading, extension and promotion of cycleways to and within major urban recreation destinations such as Centennial Park, Sydney Olympic Park, Parramatta Park and the Western Sydney Parklands.

3.2 Project need

This section provides a description of the strategic context and a summary of the transport modelling, which demonstrate the need for the project.

3.2.1 Western Sydney Airport and Western Sydney Aerotropolis

Western Sydney Airport, which will begin operations in 2026, and Western Sydney Aerotropolis, which will be developed over the next 20 years, will be transformative and become economically critical to Greater Sydney and the NSW economy. An estimated 28,000 jobs are expected to be provided by 2031, which is expected to grow to nearly 48,000 by 2041 (Greater Sydney Commission, 2018a). Full operation of the airport will raise this to 60,000 jobs (Department of Infrastructure and Regional Development, 2016).

To support the airport and realise economic growth objectives for Western Sydney, a dedicated mixed-use business development zone, the Western Sydney Aerotropolis (see **Figure 3-2**), is planned for land surrounding the airport. The combined effect of the Western Sydney Airport and the Aerotropolis is expected to significantly increase traffic demand, placing pressure on the existing local road network (**Section 7.2** provides a summary of the projected traffic demand and the capacity of the existing road network). There is a need to ensure that connections to the rest of Greater Sydney's transport network are provided to support and maintain Western Sydney Aerotropolis as the catalyst for economic growth in western Sydney.

In the longer term, Western Sydney Aerotropolis would be supported by both passenger rail, via Sydney Metro Greater West, and freight rail via the Western Sydney Freight Line and the Outer Sydney Orbital corridors. In the short to medium term, the primary means of access would be by road. The existing roads that surround Western Sydney Aerotropolis, including Elizabeth Drive, the M7 Motorway and The Northern Road, are currently reaching the limits of their capacity during peak periods.

The WSIP, described in **Section 3.1.7**, seeks to address many of these constraints, particularly with the current upgrade of The Northern Road. However even with this upgrade, access to Western Sydney Aerotropolis would still require travel along existing constrained corridors, including Elizabeth Drive and the M7 Motorway.

3.2.2 Access to Western Sydney Aerotropolis

Elizabeth Drive is a primary arterial road that connects Liverpool to Luddenham serving residential land uses to the east of the M7 Motorway and rural land uses to the west of the M7 Motorway. Without the project, Elizabeth Drive would form the main road access between Western Sydney Aerotropolis and the rest of the strategic road network.

The M7 Motorway is the only north–south motorway corridor through Western Sydney. It allows for uninterrupted movement between north-west and south-west Sydney, connecting to east–west motorways including the M5 Motorway, M4 Motorway and M2 Motorway. Strong growth in travel demand has resulted in traffic volumes on the M7 Motorway increasing to levels that approach capacity for much of the day. The project would provide an alternative route to the M7 Motorway and the M4 Motorway for trips between Liverpool and Penrith.

The Northern Road connects Penrith to Narellan and is currently a single-lane rural road between Peter Brock Drive and the M4 Motorway. The Northern Road is currently being upgraded to realign the road around the Western Sydney Airport site and to increase its capacity from a single-lane in each direction to at least two lanes in each direction.

Roads and Maritime collect traffic volume data across the Sydney arterial and motorway road network; historic traffic count data on Elizabeth Drive east of the M7 Motorway between 2008 and 2018 is provided in **Figure 3-5**. These historic traffic counts show a steady trend of growth in traffic demand over the last 10 years, averaging three per cent per annum. This points to a strong trend in increasing traffic demand in Sydney over the last decade.

Forecast future traffic demand points to the need for a new high-capacity road to provide access to and from Western Sydney Aerotropolis and surrounding growth areas and allow this traffic to bypass the existing constrained road network including Elizabeth Drive and its interchange with the M7 Motorway.

The project would support and maintain Western Sydney Aerotropolis as the catalyst for economic growth in western Sydney by providing a high-speed motorway standard access from the Sydney Motorway network at the M7 Motorway and the arterial road network at The Northern Road. This would allow traffic travelling to and from the Western Sydney Airport to avoid travelling on Elizabeth Drive. The project would provide an alternative east–west route between the M7 Motorway and The Northern Road, reducing the volumes on Elizabeth Drive and removing conflicting movements at key intersections such as the M7 Motorway and Elizabeth Drive interchange.

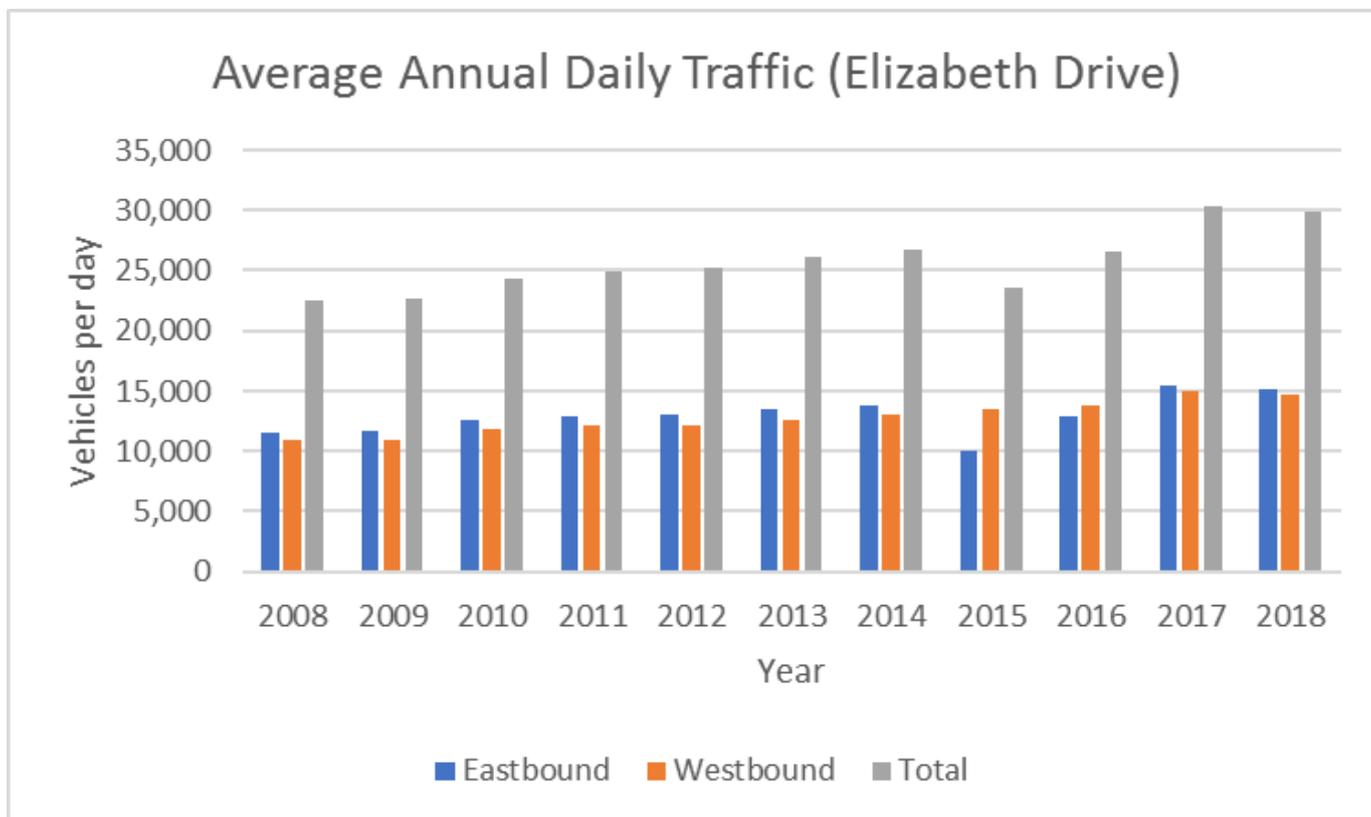


Figure 3-5 Historic traffic volumes on Elizabeth Drive east of the M7 Motorway

3.2.3 Growth of Western Parkland City

Western Sydney's transport network faces complex challenges now and over the next 20 years. Western Sydney's population is anticipated to increase from two million today to three million by 2036, which equates to an average of 50,000 additional residents per year. This growth will put substantial pressure on the existing transport network, in particular the strategic transport corridors shown in **Figure 3-4**, which facilitate the movement of people and goods to population and employment centres across Greater Sydney. As part of a multimodal network-wide effort to tackle western Sydney's transport challenges, major investments in road capacity across western Sydney are required to address network underperformance and support western Sydney's long-term economic growth.

Addressing western Sydney's complex challenges involves identifying the right strategic investments to provide long-term network capacity, including modern road infrastructure, freight and passenger rail, and public and active transport, consistent with *Future Transport 2056* as discussed in **Section 3.1.8**.

Therefore, the project would be both a critical component to improving road network efficiency across western Sydney in the long-term, and part of a wider integrated transportation plan that includes public transport initiatives.

The project would help address western Sydney's future transport challenges as follows:

- The project would address major capacity constraints on the arterial road network arising from the development and operation of the Western Sydney Airport. Without the project, ageing, narrow or lower-order roads would perform a traffic function that is better suited to motorway infrastructure. This would reduce amenity and results in congestion, increased travel times, decreased travel time reliability and more traffic incidents.
- The project would facilitate the Greater Sydney Region Plan's goal of delivering a 30-minute city by facilitating greater access to jobs within 30 minutes of people's homes in western Sydney.

- The project would provide critical land transport network capacity to and from Western Sydney Aerotropolis. When operational and fully developed, these will be major trip generators and will be economically critical to Greater Sydney and the NSW economy. Even with major public transport and freight initiatives currently under investigation in western Sydney (for example Sydney Metro Greater West and the Western Sydney Freight Line), major new road capacity is needed to connect Western Sydney Aerotropolis to markets and customers across Greater Sydney.
- The project would serve Greater Sydney's wider, highly diverse freight and business travel task. The freight, commercial and service travel tasks require the distribution of goods and services across Greater Sydney, which relies on more diverse and dispersed point-to-point transport connections. The project supports this task by providing connections between Western Sydney Aerotropolis and other employment areas and population centres.
- The project would serve natural growth in demand from Greater Sydney's growing population and economy. Over the next 20 years, the number of average weekday trips across Greater Sydney is forecast to increase by 40 per cent, while freight volumes are forecast to double. Much of this growth would occur on the motorway network.
- The project would better serve the fragmented land use patterns across Greater Sydney by supporting efficient transport connections for trips that are not well-served by other transport modes due to uneven or fragmented economic or residential development.

3.2.4 Projected transport and traffic

The combination of projected population growth and land use change, and construction and operation of the new Western Sydney Airport will result in an increase in traffic and transport in the area.

The transport and traffic assessment (**Section 7.2**, with full assessment report provided in **Appendix F**) provides a summary of the forecast changes to the transport network for the years 2026 and 2036 if the project were not built (ie the 'do minimum' scenario). This represents a 'do minimum' scenario when the Western Sydney Airport is operational, with access provided directly from Elizabeth Drive.

Without the project, the transport network in the wider study area would experience the following key issues:

- Traffic volumes on key roads in the wider study area are forecast to increase substantially, almost doubling by 2036 from 2017 volumes. This is indicative of the large planned land releases occurring in the Western Sydney Aerotropolis, Western Sydney Employment Area and the South West Growth Area.
- The majority of arterial and motorway corridors surrounding the study area would experience high delays at critical constraints in the network, including:
 - The M7 Motorway northbound and southbound between Hoxton Park Road and the M4 Motorway
 - Elizabeth Drive east and west of the M7 Motorway interchange
 - Wallgrove Road in the vicinity of the M7 Motorway, The Horsley Drive and Elizabeth Drive
 - Cowpasture Road between the M7 Motorway and Hoxton Park Road.
- Many intersections along Elizabeth Drive would operate at an unsatisfactory Level of Service (LoS) of E or worse by 2026 (these currently operate at LoS A or B), reflecting forecast traffic demands that exceed available capacity at most of these intersections, even after upgrades.
- Potential intersection upgrades along Elizabeth Drive in 2026 and full widening of the corridor to four-lanes in 2036 would still result in high delays in 2026 and 2036 because of the high volume of traffic forecast for the corridor. Further, despite these potential corridor upgrades, there is limited scope to add capacity at the Elizabeth Drive and M7 Motorway interchange, where conflicting demand between Elizabeth Drive and the M7 Motorway traffic would result in lengthy delays by 2036.

- The assumed widening of the M7 Motorway by 2036 would reduce main line delays caused by heavy vehicles, particularly northbound on approach to Elizabeth Drive and reduce travel times. However, many of the interchanges along the M7 Motorway have limited capacity and would experience congestion on the arterial road network at locations, including Camden Valley Way, Cowpasture Road, Bernera Road, The Horsley Drive and Elizabeth Drive.

The project would be integrated with future transport infrastructure to create links and strategic connections throughout western Sydney and the Greater Sydney area, helping to cater for future traffic volumes and alleviating forecast congestion in the network.

3.3 Project objectives

3.3.1 Western Sydney Infrastructure Plan Program Objectives

The primary program objectives of WSIP are:

- Development and demand – Support a western Sydney airport, land use change and residential growth, balancing the functional, social, environmental and value for money considerations
- Connectivity to airport – Provide a resilient connection for freight and passengers to a western Sydney airport at Badgerys Creek
- Integrated network – Provide road improvements to support and integrate with the broader transport network
- Customer focus – Provide meaningful engagement with customers and stakeholders throughout the program life.

The project would provide a number of benefits that are in the public interest, which include:

- Facilitate the construction and ongoing operation of the Western Sydney Airport
- Accommodate future traffic growth and improve accessibility for road users accessing the Western Sydney Aerotropolis and other development projects in western Sydney
- Develop new infrastructure for public and active transport modes
- Support regional benefits related to the broader program of upgrades proposed under the WSIP, such as the provision of high capacity traffic and freight links.

Following identification of the broad WSIP program objectives, specific project objectives for the M12 Motorway were developed. These are presented in **Section 3.3.2**.

3.3.2 Project Objectives

The project objectives are to:

- Provide sufficient road capacity to meet traffic demand generated by the planned western Sydney urban development
- Provide a high standard connection to the airport with capacity to meet future freight and passenger needs
- Provide a road which supports and integrates with the broader transport network
- Support the provision of an integrated regional and local public transport system
- Preserve the access function of Elizabeth Drive
- Provide active local transport within the east–west corridor
- Make provision for connection to the future Outer Sydney Orbital.

3.4 Statement of strategic need

The project is considered to be essential for the State for economic reasons – principally due to the role that it would have in facilitating the development of, and access to, the Western Sydney Airport, Western Sydney Aerotropolis, employment lands and South West Growth Area. The project was designed to integrate with existing and planned road and transport infrastructure and would create links and strategic connections throughout western Sydney and the Greater Sydney area.

Western Sydney is expected to experience record growth, with around one million additional people living in the region by 2036. The project would allow for an increasing number of residents in western Sydney to access nearby jobs, housing and transport, health facilities, schools and social infrastructure through the provision of transport links. The project would provide essential road capacity to cater for major planned development and reduce projected future demand on the local road network.

As presented throughout **Section 3.1**, the project would fulfil the goals and objectives of numerous strategic planning instruments, including:

- The NSW State Infrastructure Strategy
- The Greater Sydney Commission's Greater Sydney Region Plan
- The Western Sydney Aerotropolis Land Use and Infrastructure Implementation Plan.

4. Project development and alternatives

This chapter describes the various alternatives to the project that were considered as part of the project development process and explains how and why the project was selected. It then describes and analyses the different route options that were investigated and justifies why the preferred alternative (the project) was selected. Design refinements for particular elements of the project are also presented, demonstrating how the project was designed to avoid or minimise adverse impacts.

Table 4-1 outlines the SEARs that relate to the development of alternatives and options of the project.

Table 4-1 SEARs (project development and alternatives)

Secretary's requirement	Where addressed in this EIS
2. Environmental Impact Statement	
1. The EIS must include, but not necessarily be limited to, the following: (...)	
e. an analysis of any feasible alternatives to the project ¹	Alternatives to the project are presented in Section 4.1
f. a description of feasible options within the project ²	Options within the project are presented in Section 4.3 to Section 4.5
g. a description of how alternatives to and options within the project were analysed to inform the selection of the preferred alternative / option. The description must contain sufficient detail to enable an understanding of why the preferred alternative to and options(s) within the project were selected	A description of how route operations were analysed and selected is presented in Sections 4.2, 4.3, 4.6 and 4.7 The preferred option, and why it was selected, is presented in Section 4.5.9 to Section 4.8
i. a demonstration of how the project design was developed to avoid or minimise likely adverse impacts	A demonstration of how the project design was developed would avoid or mitigate adverse impacts is presented in Section 4.6 and Section 4.7

¹ Alternatives to a project are different projects which would achieve the same project objective(s) including the consequences of not carrying out the project. For example, alternatives to a road project may be a rail project in the same area and alternative routes for roads.

² Options within the project are variation of the same project. For example, options within a road project could be staged delivery, tolls, design of an intersection, the location or design of a bridge, locations for a vent stack.

4.1 Alternatives

The project development process considered possible alternative ways of meeting the project objectives and providing access to western Sydney and the Western Sydney Airport.

The following alternatives were considered:

- Alternative 1 – Do nothing (base case)
- Alternative 2 – ‘do minimum’ (upgrading Elizabeth Drive)
- Alternative 3 – Rail as an alternative mode of transport
- Alternative 4 – Motorway (the project).

The above alternatives are discussed in the following sections.

4.1.1 Alternative 1 –‘Do nothing’ (base case)

The ‘do nothing’ alternative would involve providing no additional transport capacity in the project area, outside of planned local road upgrades.

This alternative would have a number of drawbacks:

- It would not meet any of the WSIP or project objectives (see **Table 4-2**)
- It would not provide dedicated road access to the Western Sydney Airport, and would therefore not provide enough capacity to accommodate future traffic needs or contribute to growth at the Western Sydney Airport and the planned land use changes around the airport.

Strategic modelling of the road network in Western Sydney carried out by Roads and Maritime, particularly surrounding the Western Sydney Aerotropolis, shows that the forecast traffic demand associated with increased population and employment in Western Sydney would exceed the capacity of the existing road network (see **Section 7.2**).

The ‘do nothing’ alternative was, therefore, discounted as a realistic alternative and not considered further.

Table 4-2 Performance of Alternative 1 against key WSIP and project objectives

Project objective	Meets objective?
WSIP program objectives	
Development and demand – Support a Western Sydney Airport, land use change and residential growth, balancing the functional, social, environmental and value for money considerations	No
Connectivity to airport – Provide a resilient connection for freight and passengers to a Western Sydney Airport at Badgerys Creek	No
Integrated network – Provide road improvements to support and integrate with the broader transport network	No
Customer focus – Provide meaningful engagement with customers and stakeholders throughout the program life	No
Roads and Maritime project objectives	
Provide sufficient road capacity to meet traffic demand generated by the planned western Sydney urban development	No
Provide a high standard connection to the airport with capacity to meet future freight and passenger needs	No
Provide a road which supports and integrates with the broader transport network	No
Support the provision of an integrated regional and local public transport system	No
Preserve the access function of Elizabeth Drive	No
Provide active local transport within the east–west corridor	No
Make provision for connection to the future Outer Sydney Orbital.	No

4.1.2 Alternative 2 – Do minimum (upgrading Elizabeth Drive)

The 'do minimum' alternative would involve limited upgrades to the existing Elizabeth Drive from a two-lane undivided road to a dual carriageway (two lanes in each direction) arterial road. This alternative would include signalling intersections, adjusting utilities and ensuring the bridges would be above flood levels. The key features of this alternative include:

- Upgrade of Elizabeth Drive to a four-lane arterial road (two lanes in each direction) with a wide median to cater for future widening to six lanes
- Upgrade of Elizabeth Drive between the existing M7 Motorway interchange and the intersection of The Northern Road
- New bridges at Badgerys Creek, South Creek and Kemps Creek crossings
- New culverts at Oaky Creek and Cosgroves Creek (and other locations)
- New signalised intersections at Luddenham Road/Adams Road, Badgerys Creek Road, Martin Road, Western Road, Devonshire Road/Salisbury Road, Mamre Road, Duff Road and Cecil Road
- Left in / left out intersections at Lawson Street and Clifton Avenue
- Existing driveways on Elizabeth Drive would become left-in / left-out only.

Elizabeth Drive is an important arterial road that runs east–west, connecting Liverpool with Luddenham. It is about 14 kilometres of mostly two-lane undivided road, with no footpaths and no median. There was an increase in vehicle usage on Elizabeth Drive between 2006 and 2015. In 2015, the average daily traffic count on Elizabeth Drive, near the intersection with the M7 Motorway, was 45,883 vehicles.

Roads and Maritime completed a traffic assessment as part of the strategic business case for the 'do minimum' alternative, based on core area forecasts, which modelled this alternative for 2026 and 2036. The results of the traffic assessment show that there would be insufficient capacity along Elizabeth Drive to cater for future traffic flow and would therefore result in less reliable journeys.

The results of the modelling indicate that Elizabeth Drive would operate at a LoS of E in 2026 with Stage 1 operation of the Western Sydney Airport and LoS F by 2036 (Western Sydney Airport EIS (DIRD, 2016)). Roads and Maritime require any road upgrade to operate at LoS C, 10 years after opening. The upgrade of Elizabeth Drive would, therefore, not achieve a LoS C.

Alternative 2 would also not meet the WSIP program objective of providing resilient transport connections to the Western Sydney Airport site or the Roads and Maritime project objective of providing a high standard connection to the Western Sydney Airport (see **Table 4-3**).

Operational traffic modelling conducted as part of the project has taken into consideration the effect of the implementation of the proposed upgrade.

Improvements to Elizabeth Drive, a part of the arterial road network, alone is not a feasible or long-term alternative to the project and would not meet the project objectives. If combined with the project, arterial road upgrades including Elizabeth Drive, would provide more effective solutions to congested parts of the road network. As such, the 'do minimum' alternative was discounted as a realistic alternative on its own.

Table 4-3 Performance of Alternative 2 against key WSIP and project objectives

Project objective	Meets objective?
WSIP program objectives	
Development and demand – Support a Western Sydney Airport, land use change and residential growth, balancing the functional, social, environmental and value for money considerations	Partial
Connectivity to airport – Provide a resilient connection for freight and passengers to a Western Sydney Airport at Badgerys Creek	Partial
Integrated network – Provide road improvements to support and integrate with the broader transport network	Partial
Customer focus – Provide meaningful engagement with customers and stakeholders throughout the program life	Yes
Roads and Maritime project objectives	
Provide sufficient road capacity to meet traffic demand generated by the planned western Sydney urban development	Partial
Provide a high standard connection to the airport with capacity to meet future freight and passenger needs	Partial
Provide a road which supports and integrates with the broader transport network	Partial
Support the provision of an integrated regional and local public transport system	Yes
Preserve the access function of Elizabeth Drive	Partial
Provide active local transport within the east–west corridor	N/A (was not included in the scope investigated)
Make provision for connection to the future Outer Sydney Orbital.	No

4.1.3 Alternative 3 – Rail as an alternative mode of transport

Alternative 3 would involve the construction of a rail line to provide access to the Western Sydney Airport. ***Future Transport Strategy 2056*** identifies current government initiatives to expand existing rail infrastructure in western Sydney. These include the following:

- North South Rail link in Western Parkland City: St Marys – Western Sydney Airport Aerotropolis (Stage 1)
- North South Rail Link in Western Parkland City: Cudgegong Road – St Marys (Stage 2)
- North South Rail Link in Western Parkland City: Western Sydney Airport – Badgerys Creek Aerotropolis – Campbelltown-Macarthur (Stage 3)
- Western Sydney Airport – Badgerys Creek Aerotropolis – Parramatta Rail Link.

Note that stage 1 of the North South Rail Link project is now referred to as Sydney Metro Greater West and it would have a possible connection to the South-west Rail Link at Leppington.

Alternative modes of transport such as rail, on its own, would not address the needs of customers to access highly dispersed locations involving longer trips, or support the separation of inter-regional and intra-regional traffic movements.

In addition, alternatives to improve rail infrastructure would only partially contribute to relieving congestion on arterial roads and would therefore not meet the WSIP and project objective of providing sufficient road capacity to meet the expected traffic demand associated with the Western Sydney Airport and urban growth in western Sydney (see **Table 4-4**).

Table 4-4 Performance of Alternative 3 against key WSIP and project objectives

Project objective	Meets objective?
WSIP program objectives	
Development and demand – Support a Western Sydney Airport, land use change and residential growth, balancing the functional, social, environmental and value for money considerations	Yes
Connectivity to airport – Provide a resilient connection for freight and passengers to a Western Sydney Airport at Badgerys Creek	Yes
Integrated network – Provide road improvements to support and integrate with the broader transport network	No
Customer focus – Provide meaningful engagement with customers and stakeholders throughout the program life	Yes
Roads and Maritime project objectives	
Provide sufficient road capacity to meet traffic demand generated by the planned western Sydney urban development	No
Provide a high standard connection to the airport with capacity to meet future freight and passenger needs	Yes
Provide a road which supports and integrates with the broader transport network	No
Support the provision of an integrated regional and local public transport system	Yes
Preserve the access function of Elizabeth Drive	Yes
Provide active local transport within the east–west corridor	No
Make provision for connection to the future Outer Sydney Orbital.	No

It is recognised that to service the transport needs of the Western Sydney Airport and the western Sydney region more broadly, a multi-modal approach will be required, and no transport mode on its own can meet all those needs.

Roads and Maritime is currently consulting with Sydney Metro to ensure that metro infrastructure would integrate with the existing and future road network in western Sydney.

4.1.4 Alternative 4 – Motorway (the project)

Alternative 4 would involve the construction of a new motorway between the M7 Motorway and The Northern Road, connecting into the Western Sydney Airport. The construction of a motorway would respond to and support the NSW and Australian Governments’ planning and policy frameworks described in **Section 3.1** and would also support the NSW Government’s commitment to facilitate the Australian Government’s timetable and transport functionality for construction and operation of the Western Sydney Airport.

Constructing a new motorway would best meet the WSIP and project objectives as it would cater for projected traffic demands and improve connections to the Western Sydney Airport and other planned developments for freight and commuters. The WSIP also identifies several other key infrastructure projects that could be accessed via a new motorway. Constructing a new motorway would improve transport connections to those transport corridors, including The Northern Road, thereby providing a high capacity integrated road network.

A summary of the assessment of a new motorway (Alternative 4) against the WSIP and project objectives is provided in **Table 4-5**.

Table 4-5 Performance of Alternative 4 against key WSIP and project objectives

Project objective	Meets objective?
WSIP program objectives	
Development and demand – Support a Western Sydney Airport, land use change and residential growth, balancing the functional, social, environmental and value for money considerations	Yes
Connectivity to airport – Provide a resilient connection for freight and passengers to a Western Sydney Airport at Badgerys Creek	Yes
Integrated network – Provide road improvements to support and integrate with the broader transport network	Yes
Customer focus – Provide meaningful engagement with customers and stakeholders throughout the program life	Yes
Roads and Maritime project objectives	
Provide sufficient road capacity to meet traffic demand generated by the planned western Sydney urban development	Yes
Provide a high standard connection to the airport with capacity to meet future freight and passenger needs	Yes
Provide a road which supports and integrates with the broader transport network	Yes
Support the provision of an integrated regional and local public transport system	Yes
Preserve the access function of Elizabeth Drive	Yes
Provide active local transport within the east–west corridor	Yes
Make provision for connection to the future Outer Sydney Orbital.	Yes

Alternative 4 was selected as the preferred alternative as it would:

- Provide a safe, modern, high capacity motorway to support future increased traffic generated by the construction and operation of the Western Sydney Airport and development in western Sydney
- Link with other proposed road upgrades in the region (eg The Northern Road and the Outer Sydney Orbital) to provide a high capacity integrated road network and link to the Western Sydney Airport
- Link with other motorways in the area, through the M7 Motorway interchange
- Provide walking and cycling access to the Western Sydney Airport site via a new shared user path
- Allow for the retention of bus routes and bus stops along the surrounding local road network
- Allow for a future rail corridor crossing the M12 Motorway alignment adjacent to the Western Sydney Airport interchange

- Not preclude rail infrastructure improvements. Any rail infrastructure would be complementary to this alternative as it would further reduce the number of vehicles on roads and provide an opportunity for place making
- Service the traffic demand generated by the planned western Sydney urban development
- Allow for future north–south connections
- Provide capacity to meet future freight and passenger needs.

4.2 Route options development

In December 2015, Roads and Maritime carried out a strategic route options analysis (SROA) for a new M12 Motorway between the M7 Motorway, Cecil Park and The Northern Road, Luddenham (Roads and Maritime, 2016b) to identify the preferred route corridor. The analysis identified a longlist of route options. In February 2016 this was then narrowed to a shortlist of route options before selection of the preferred route corridor. A summary of this process is described in **Table 4-6** with the route options described further in **Section 4.3** to **Section 4.5**.

Table 4-6 Strategic Route Options Analysis process

Timing	SROA process	Document
July 2015	The M12 Motorway was announced as part of the WSIP and a series of community information sessions were held. The community was asked to provide feedback on the study area identified by Roads and Maritime as being the best general location for route corridor options to be developed.	
September 2015	A long list of possible route corridor options was identified with consideration of technical and environmental constraints, and community feedback received on the study area.	<u>M12 Motorway Strategic Route Options Analysis: Options Identification Report</u> (Roads and Maritime, 2015a)
October 2015 – February 2016	The long list of route corridor options was assessed against criteria to identify the shortlisted route options. The shortlisted route options were placed on public exhibition for comment in February 2016.	<u>M12 Motorway Strategic Route Options Analysis: Shortlisted Options Report</u> (Roads and Maritime, 2016b)
February 2016 – November 2016	<p>During the public exhibition period, a workshop was held to identify the most suitable location for the M12 Motorway and The Northern Road connection considering future transport projects. In response to this and the community feedback, modifications were made to the shortlisted corridor options.</p> <p>The modified shortlisted route corridor options were reviewed, and a value management workshop was held to evaluate each option against a range of social, environmental and economic considerations.</p> <p>The preferred route corridor was announced in November 2016.</p>	<u>M12 Motorway Strategic Route Options Analysis: Preferred Corridor Route Option</u> (Roads and Maritime, 2016c).

Timing	SROA process	Document
December 2016 – June 2017	Following announcement of the preferred route corridor, two strategic land use documents were developed: The Greater Sydney Commission released the draft Western City District Plan and the Western Sydney Parklands Trust prepared the draft Western Sydney Parklands Southern Parklands Framework (WSPT, 2018b). As illustrated by these documents, the M12 Motorway would be in direct conflict with the future land use of the Cecil Hills Precinct of the Western Sydney Parklands. In response, Roads and Maritime committed to investigate alternative route options within the Western Sydney Parklands.	<u>Western City District Plan</u> (Greater Sydney Commission 2018b) <u>Western Sydney Parklands - Southern Parklands Framework</u> (WSPT, 2018b)
June 2017	Alternative route options in the Western Sydney Parklands were developed in addition to the preferred corridor route. The options were presented at a supplementary value management workshop in June 2017. Attendees recommended a new option within the Western Sydney Parklands. The recommended option was announced in February 2018.	<u>Value Management Report: Eastern Section of the M12 Motorway</u> (Roads and Maritime, 2018)

The methodology for identifying the preferred route option involved the following key stages:

- Setting a consistent set of criteria to assess options
- Consideration of the findings from technical and environmental investigations
- Use of computer software ('Quantm') to identify a long list of route options based on a combination of design, environmental and cost considerations
- Consideration of feedback received from the community
- Consideration of outcomes of the value management workshops.

The methodology and process carried out is outlined in further detail in **Sections 4.3 to 4.8**.

4.3 Route corridor options – long list

The process for identifying a long list of route corridor options involved establishing feasible corridors which could satisfy the project objectives and design principles, including engineering standards and environmental and socio-economic issues. It considered opportunities and constraints in the study area.

The Quantm software package was used to develop a range of feasible 300-metre-wide corridors by combining design standards, terrain, geological, and hydrological data, environmental constraints, property ownership, and cost information.

The Quantm software produced several hundred alignments using varying parameters and sensitivity analysis. For ease of comparison, the study area was divided into four zones from east to west and named A, B, C and D (see **Figure 4-1**). The corridor options in these zones were:

- Zone A – corridor options A0, A1 and A2
- Zone B – corridor options B0, B1, B2, B3 and B4
- Zone C – corridor options C0, C1 and C2
- Zone D – corridor option D1.

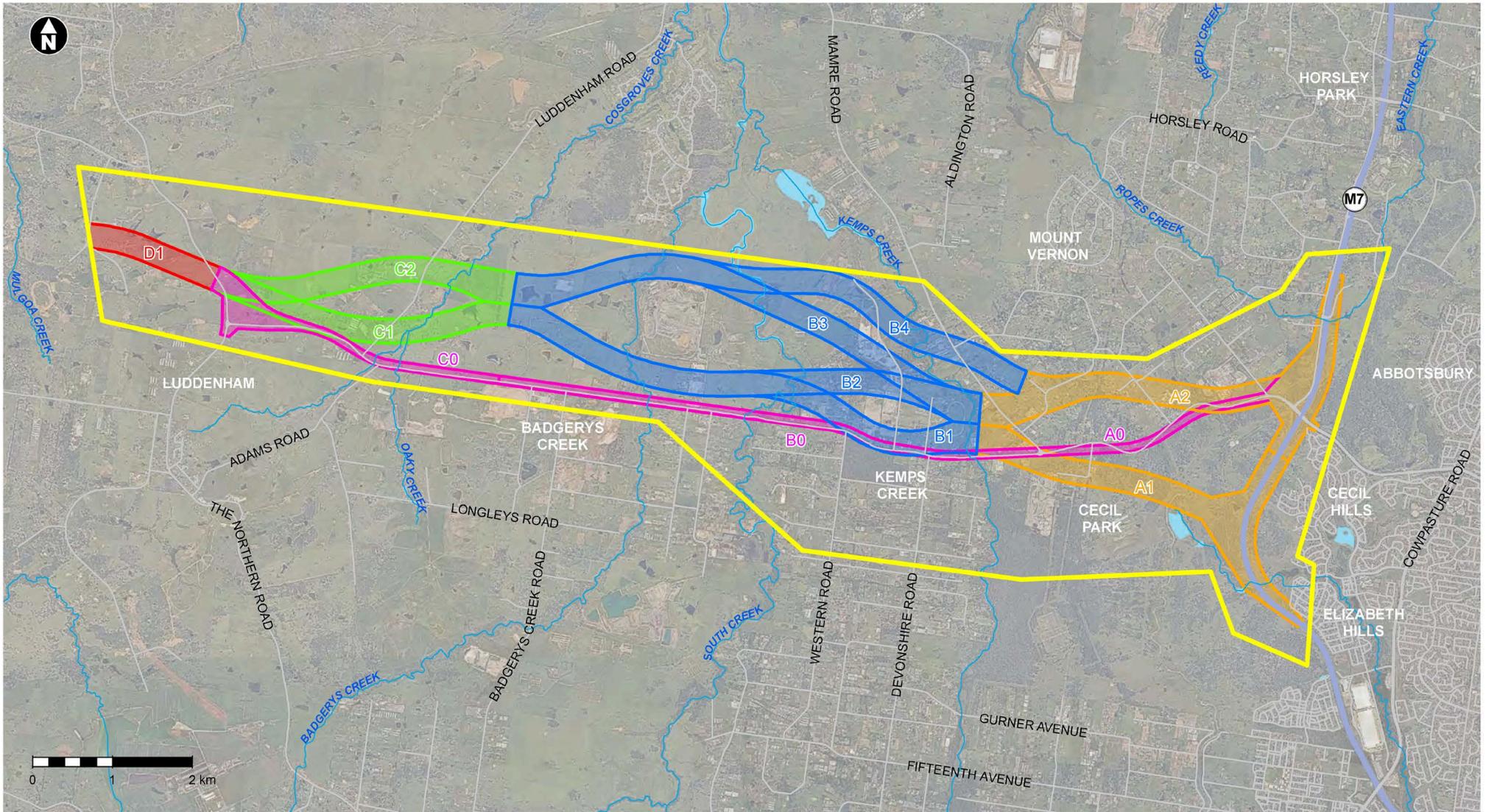


Figure 4-1 Long list route corridor options

Date: 20/06/2019 Path: J:\EIP\Projects\04_Eastern\14510\08_Spatial\GIS\Directory\templates\MXD\IFigures\EIS\Chapters\Chapter4_ProjectDevelopment\FinalEIS\JA\JV_EIS_Chap4_F002_RouteOptions_f2v1.mxd Created by: AA | QA by: NS

Connecting these corridors across the study area created 15 possible route corridor options that became the long list for the project. However, there were some common connections:

- Corridor D1 was common to all route options
- Corridors A0, B0 and C0 could only connect to one another
- Corridor B4 could only connect to corridor A2.

The 15 possible route corridor options identified by the Quantm software are presented in **Table 4-7** and **Figure 4-1**. Route corridor option 1 would involve a new motorway along the same alignment of Elizabeth Drive.

Table 4-7 Long list of route corridor options and their corridor option components

Route option	Zone A	Zone B	Zone C	Zone D
1	A0	B0	C0	D1
2	A1	B1	C1	D1
3	A1	B1	C2	D1
4	A1	B2	C1	D1
5	A1	B2	C2	D1
6	A1	B3	C1	D1
7	A1	B3	C2	D1
8	A2	B1	C1	D1
9	A2	B1	C2	D1
10	A2	B2	C1	D1
11	A2	B2	C2	D1
12	A2	B3	C1	D1
13	A2	B3	C2	D1
14	A2	B4	C1	D1
15	A2	B4	C2	D1

4.4 Route options – short list

A range of desktop environmental assessments were carried out to assess the long list of route options in order to develop a short list of route options. These included investigations into biodiversity, Aboriginal and non-Aboriginal heritage, land use planning, hydrology, flooding, socio-economic, traffic, soils, contamination, water, landscape character and utility considerations.

A value management workshop was held on 7 October 2015, to review constraints and opportunities identified for each route option. The participants included a range of stakeholders including representatives from State and Australian Government agencies, local councils, Roads and Maritime and the project team (Roads and Maritime, 2016c).

The long list route options identified in **Table 4-7** were reviewed and scored against assessment criteria, to recommend a short list of route options for further investigation and development. The assessment criteria used were:

- Project delivery:
 - Timelines to plan and deliver, identify design risks, organise project approvals, arrange land acquisitions, avoid risks or other issues
 - Potential for construction staging, constructability, lead time for relocations or specific items and construction risk
- Land use
 - Integration with current land use and proposed land use (that is, non-sterilising); provision for property access consistency with Broader Western Sydney Employment Area and Western Sydney Aerotropolis
- Community impact:
 - Number of properties impacted
 - Number of existing businesses directly impacted
 - Community severance
 - Number of sensitive receivers within 600 metres (noise and pollution)
- Environment and heritage:
 - Number of Aboriginal and non-Aboriginal heritage sites affected
 - Total area of native vegetation affected
 - Area of endangered ecological community/critically endangered ecological community affected
 - Drainage lines and creek lines
- Functionality:
 - Grades, speeds, length, interchanges and connectivity to future Outer Sydney Orbital
 - Ability of Elizabeth Drive to operate as an arterial road in the future
 - Impact on the M7 Motorway and the rest of the network
 - Active transport and public transport.

The value management workshop discounted several options due to their impacts on the community and to properties, and recommended the following options from **Table 4-7** to progress further:

- Route options 4, 5, 6 and 7
- Route options 10, 11, 12, 13, 14 and 15.

Other long list options were discounted for the following reasons:

- Poor overall performance against the assessment criteria
- Not able to meet the objective of preserving the existing function of Elizabeth Drive
- Poor performance of option B1 from direct property impacts and social impacts (passes close to Elizabeth Drive and through the Kemps Creek village shops)
- Removal of A2 as it did not perform as well as option A1.

Option 1 (a new motorway along the alignment of Elizabeth Drive) was discounted due to potential property, community and environmental impacts, poor performance against many other route options, and because it was the second most expensive option

In addition, the value management workshop identified further work needed to be carried out in Zone A to develop the shortlisted route options. This included:

- Retaining route corridor option A0 but increasing the corridor width to 300 metres to be comparable to other options. This modified option was called option A3
- Investigating other connections for option B4 with route corridor options in Zone A. While option B4 scored well against the assessment criteria, it only linked to route corridor option A2 and was therefore seen as potentially not being viable unless it linked to other route corridor options.

A workshop was then held with the project team on the 8 October 2015. The aim of the workshop was to identify the final shortlisted route options taking into consideration the findings of the value management workshop.

The workshop identified the following shortlisted options in each zone:

- Zone A – route corridor options A1 and A3
- Zone B – route corridor options B2 and B5. To connect corridor option B4 to the remaining Zone A options, B4 was realigned, which resulted in this option sharing most of its length with option B3; as such option B3 was removed and the modified B4 became option B5
- Zone C – route corridor options C1 and C2
- Zone D – route corridor option D1.

Overall, the workshop recommended eight shortlisted route options to be taken further for investigation. The options were given a unique colour for ease of identification and to avoid confusing the options as being ranked by number or letter. These colours are set out in **Table 4-8** and shown in **Figure 4-2**.

Further detail on the shortlisting process can be found in the **M12 Motorway Strategic Route Options Analysis report: Shortlisted options report** (Roads and Maritime, 2016c).

Table 4-8 Shortlisted route options

Route option	Zone A	Zone B	Zone C	Zone D	Description
Option 4 – Aqua	A1	B2	C1	D1	Unchanged from option 4 in Table 4-7
Option 5 – Blue	A1	B2	C2	D1	Unchanged from option 5 in Table 4-7
Option 16 – Green	A1	B5	C1	D1	Option 6 (A1, B3, C1, D1) from Table 4-7 , incorporating corridor option B5 instead of B3 Option B5 was introduced in the project team workshop, connecting corridor option B4 to both remaining Zone A options, along the line of option B3
Option 17 – Orange	A1	B5	C2	D1	Option 7 (A1, B3, C2, D1) from Table 4-7 , incorporating corridor option B5 instead of B3 Option B5 was introduced in the project team workshop, connecting corridor option B4 to both remaining Zone A options, along the line of option B3
Option 18 – Pink	A3	B2	C1	D1	Option 10 (A2, B2, C1, D1) from Table 4-7 , incorporating corridor option A3 instead of option A2 Option A3 was introduced in the project team workshop and was a modification to option A0 to avoid a school located north of Elizabeth Drive, increasing the corridor width of option A0 to be comparable with other options and extending the western end of option A0 to connect to the recommended options in Zone B

Route option	Zone A	Zone B	Zone C	Zone D	Description
Option 19 – Purple	A3	B2	C2	D1	Option 11 (A2, B2, C2, D1) from Table 4-7 , incorporating corridor option A3 instead of option A2 Option A3 was introduced in the project team workshop and was a modification to option A0 to avoid a school located north of Elizabeth Drive, increasing the corridor width of option A0 to be comparable with other options and extending the western end of option A0 to connect to the recommended options in Zone B
Option 20 – White	A3	B5	C1	D1	This was a new route option, comprising corridor options A3, B5, C1, D1
Option 21 – Yellow	A3	B5	C2	D1	This was a new route option, comprising corridor options A3, B5, C2, D1

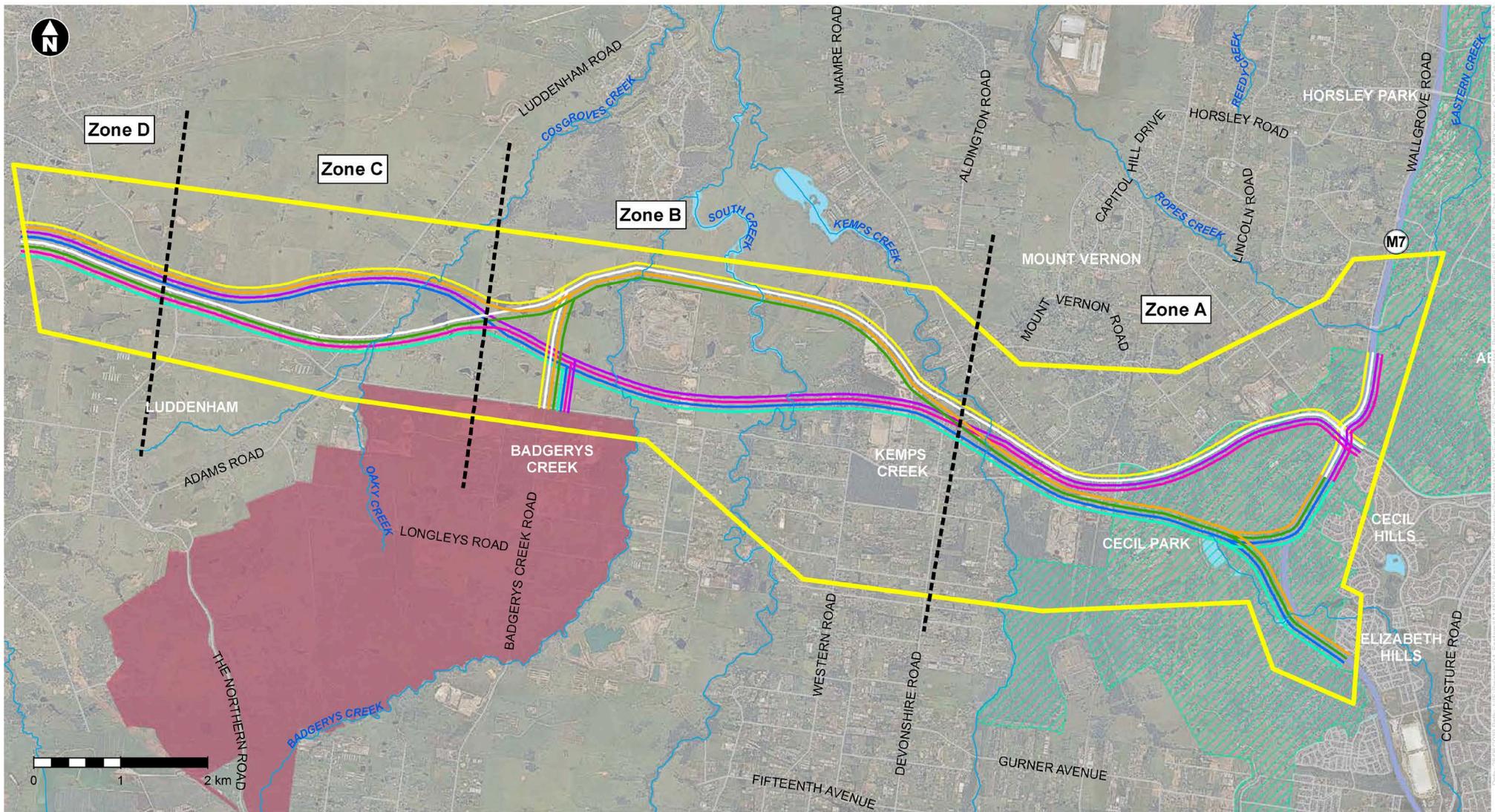
4.5 Route options – modified short list

In February 2016, the eight shortlisted route options for the M12 Motorway (discussed in **Section 4.4**) were placed on public display. The display materials showed an area comprising half of zone C and all of zone D as subject to further investigation into the development of the future road network in the area. Each route option consisted of a corridor about 300 metres wide.

During the public display period, Roads and Maritime held a Transport Study workshop with attendees from Australian and other NSW Government agencies. The aim of the workshop was to identify the most suitable location for the M12 Motorway connection with The Northern Road and other future transport projects to better cater for current and future land uses.

The additional investigations into zone C and zone D included the development of an integrated road network plan to ensure the preferred option supported the future road network in the area. The plan included investigation of the function and design of the future M12 Motorway, The Northern Road, Elizabeth Drive and the connection to Luddenham from The Northern Road. The investigations were considered in conjunction with the community feedback and preliminary costings.

A value management workshop was held in April 2016 to obtain stakeholder input into the relative benefits of each route option. The workshop was attended by representatives from Australian and NSW Government agencies, local councils and key stakeholders.



- Motorway
 - Other roads
 - Waterways
 - Western Sydney Parklands
 - Strategic route options study area
 - Western Sydney Airport
 - Note: The roads within this zone are being removed as part of airport construction.
- Shortlisted route options**
- Aqua option
 - Blue option
 - Green option
 - Orange option
 - Pink option
 - Purple option
 - White option
 - Yellow option



Figure 4-2 Shortlisted route options

Date: 28/06/2019 Path: J:\IE\Projects\04_Eastern\A145100\08_Spatial\GIS\Directory\Templates\MXDs\Figures\EIS\Chapters\Chapter4_ProjectDevelopment\Final\EIS\JAN_EIS_Chap4_F004_ShortlistedRIOptions_r2v1.mxd Created by: AA | QA by: JC

As a result of this, and in response to community feedback received during the public display around land use and property impacts, modifications were made to the shortlisted route options in zones C and D. The following changes were made to the shortlisted route options:

- Options C1 and C2 were replaced with options C3 and C4 as they connect with both options in zone B and provide possible future connections to the Outer Sydney Orbital:
 - The C3 route corridor option crosses Cosgroves and Oaky creeks near the confluence of the creeks, then crosses Luddenham Road north of the intersection with Elizabeth Drive and south of Blackford Hill. It passes through rural residential, agricultural and other uses; terminates at Elizabeth Drive via ramps, with Elizabeth Drive upgraded to a principal arterial road and connecting with The Northern Road
 - The C4 route corridor option crosses Cosgroves Creek and passes through rural and agricultural properties before crossing Luddenham Road about 1.2 kilometres north of the intersection with Elizabeth Drive and north of Blackford Hill. It passes through rural residential, agricultural and other land uses. It connects with The Northern Road about 900 metres north of the existing Elizabeth Drive roundabout
- Zone D was removed.

The eight modified shortlisted route options are shown in **Figure 4-3**, presented in **Table 4-9** and described in the following sections.

Table 4-9 Modified shortlisted route options

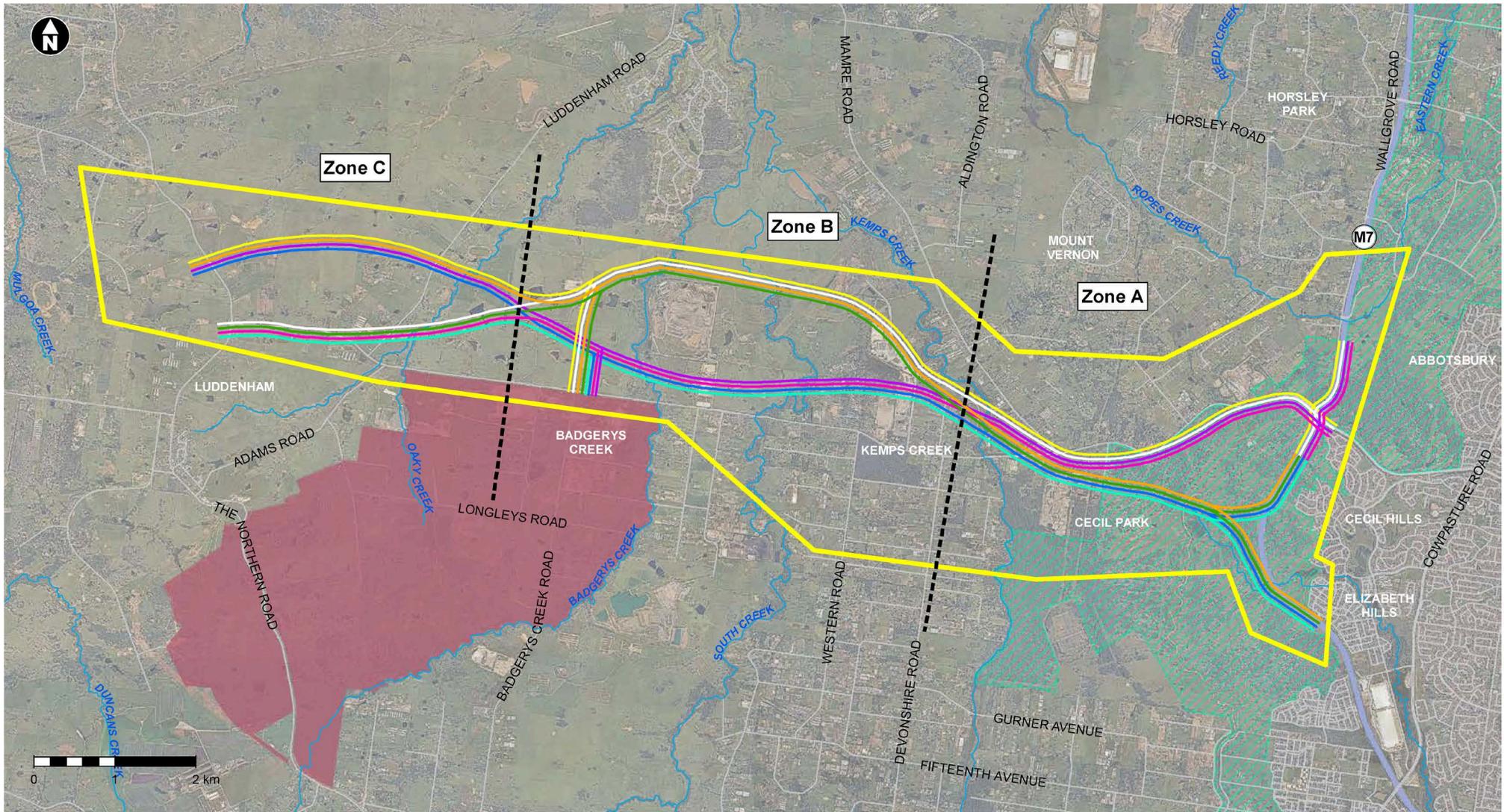
Route option	Zone A	Zone B	Zone C
Modified Aqua option	A1	B2	C3
Modified Blue option	A1	B2	C4
Modified Green option	A1	B5	C3
Modified Orange option	A1	B5	C4
Modified Pink option	A3	B2	C3
Modified Purple option	A3	B2	C4
Modified White option	A3	B5	C3
Modified Yellow option	A3	B5	C4

4.5.1 Modified Aqua option (A1-B2-C3)

The modified aqua option was 15 kilometres long, connecting to the M7 Motorway more than one kilometre south of the Elizabeth Drive interchange at a new interchange location.

The option passed through Western Sydney Parklands (including a section of the Wylde Mountain Bike Trail) in a north–westerly direction before crossing Elizabeth Drive near the existing Mamre Road intersection. It passed through a few commercial properties fronting Elizabeth Drive and Mamre Road, including the Hi-Quality Group property and Kemps Creek Sporting and Bowling Club.

The option then went around the north of the Kemps Creek village north of Elizabeth Drive, crossing Kemps Creek and passing through rural agricultural and residential properties. It also passed through some larger businesses including a quarry site and Andreasens Green Nursery. It crossed South Creek and skirted to the south of the landfill site and crossed Badgerys Creek before connecting to the planned Western Sydney Airport site through an interchange. The distance between the option and Elizabeth Drive in this area varied; at its furthest, the corridor was 700 metres away.



- Waterways
 - Strategic route options study area
 - Western Sydney Parklands
 - Western Sydney Airport
- Note: The roads within this zone are being removed as part of airport construction.
- Modified shortlisted route options**
- Green option
 - Orange option
 - Pink option
 - Purple option
 - Aqua option
 - Blue option
 - White option
 - Yellow option



Figure 4-3 Modified shortlisted route options

Date: 28/06/2019 Path: J:\IE\Projects\04_Eastern\IA145100\08 Spatial\GIS\Directory\Templates\MXDs\Figures\EIS\Chapters\Chapter4_ProjectDevelopment\Final\EIS\JA\IV_EIS_Chap4_F006_ModShListedRtOptions_r2v1.mxd Created by: AA | QA by: JC

The option then crossed Cosgroves and Oaky creeks near the confluence of the creeks, before crossing Luddenham Road just north of the intersection with Elizabeth Drive and south of Blackford Hill. It passed through rural residential, agricultural and other uses such as the Model Park in Luddenham.

The option connected to Elizabeth Drive via ramps, with Elizabeth Drive upgraded to a principal arterial road, and connected with The Northern Road.

4.5.2 Modified Blue option (A1-B2-C4)

The modified blue option was 15 kilometres long. It connected to the M7 Motorway more than one kilometre south of the Elizabeth Drive interchange at a new interchange location.

The option passed through Western Sydney Parklands (including a section of the Wylde Mountain Bike Trail) in a north–westerly direction before crossing Elizabeth Drive near the existing Mamre Road intersection. It passed through a few commercial properties fronting Elizabeth Drive and Mamre Road, including the Hi-Quality Group property and Kemps Creek Sporting and Bowling Club.

The option then passed around the north of Kemps Creek village north of Elizabeth Drive, crossing Kemps Creek and passing through rural agricultural and residential properties. It also passed through some larger businesses including a quarry site and Andreasens Green Nursery. It crossed South Creek and skirted to the south of the landfill site and crossed Badgerys Creek before connecting to the planned Western Sydney Airport site through an interchange. The distance between the option and Elizabeth Drive in this area varied; at its furthest, the corridor was 700 metres away.

The option crossed Cosgroves Creek and passed through rural and agricultural properties before crossing Luddenham Road about 1.2 kilometres north of the intersection with Elizabeth Drive and north of Blackford Hill. It passed through rural residential, agricultural and other uses such as the Luddenham Raceway.

The option connected to The Northern Road about 900 metres north of the existing Elizabeth Drive roundabout.

4.5.3 Modified Green option (A1-B5-C3)

The modified green option was 16 kilometres long. It connected to the M7 Motorway more than one kilometre south of the Elizabeth Drive interchange at a new interchange location.

The option passed through Western Sydney Parklands (including a section of the Wylde Mountain Bike Trail) in a north–westerly direction before crossing Elizabeth Drive near the existing Mamre Road intersection. It passed through several commercial properties fronting Elizabeth Drive and Mamre Road, including the Hi-Quality Group property and Kemps Creek Sporting and Bowling Club.

The option then crossed Kemps Creek and went north–west, parallel to Clifton Avenue, before heading west and passing through the former Fleurs radio telescope site and crossing South Creek. It passed to the north of the landfill site, crossing Badgerys Creek before connecting to the planned Western Sydney Airport site via an interchange. The distance between the option and Elizabeth Drive varied; at its furthest, the corridor was around 1750 metres away.

The option then crossed Cosgroves and Oaky creeks near the confluence of the creeks, before crossing Luddenham Road just north of the intersection with Elizabeth Drive and south of Blackford Hill. It passed through rural residential, agricultural and other uses such as the Model Park.

The option connected to Elizabeth Drive via ramps, with Elizabeth Drive upgraded to a principal arterial road, and connected with The Northern Road.

4.5.4 Modified Orange option (A1-B5-C4)

The modified orange option was 16 kilometres long. It connected to the M7 Motorway more than one kilometre south of the Elizabeth Drive interchange at a new interchange location.

The option passed through Western Sydney Parklands (including a section of the Wylde Mountain Bike Trail) in a north–westerly direction before crossing Elizabeth Drive near the existing Mamre Road intersection. It passed through several commercial properties fronting Elizabeth Drive and Mamre Road, including the Hi-Quality Group property and Kemps Creek Sporting and Bowling Club.

The option then crossed Kemps Creek and went north–west, parallel to Clifton Avenue, before heading west and passing through the former Fleurs radio telescope site and crossing South Creek. It passed to the north of the landfill site, crossing Badgerys Creek before connecting to the planned Western Sydney Airport site via an interchange. The distance between the option and Elizabeth Drive varied; at its furthest, the corridor was around 1750 metres away.

The option then crossed Cosgroves Creek and passed through rural and agricultural properties before crossing Luddenham Road about 1.2 kilometres north of the intersection with Elizabeth Drive and north of Blackford Hill. It passed through rural residential, agricultural and other uses such as the Luddenham Raceway.

The option connected to The Northern Road about 900 metres north of the existing Elizabeth Drive roundabout.

4.5.5 Modified Pink option (A3-B2-C3)

The modified pink option was about 16 kilometres long. It connected to the M7 Motorway at the same location as the existing Elizabeth Drive interchange.

The option generally followed the Elizabeth Drive alignment to the Mamre Road intersection. The alignment was on a more direct route than Elizabeth Drive to meet current design standards and to avoid the steep topography to the north of Elizabeth Drive. As this option would be built in the existing Elizabeth Drive corridor as much as possible, Elizabeth Drive would need to be reconstructed around the motorway.

The option passed through Western Sydney Parklands (including a section of the Wylde Mountain Bike Trail) and several commercial properties fronting Elizabeth Drive or Mamre Road including the Hi-Quality Group property and CSR Brickworks. Around the existing intersection with Mamre Road, it went north–west, crossing Kemps Creek.

The option then went around the north of Kemps Creek village north of Elizabeth Drive, passing through rural agricultural and residential properties. It also passed through some larger businesses including a quarry site and Andreasens Green Nursery. It crossed South Creek and went to the south of the landfill site and crossed Badgerys Creek. It then connected to the planned Western Sydney Airport site through an interchange. The distance between the option and Elizabeth Drive in this area varied; at its furthest, the corridor was 700 metres away.

The option then crossed Cosgroves and Oaky creeks near the confluence of the creeks, before crossing Luddenham Road just north of the intersection with Elizabeth Drive and south of Blackford Hill. It passed through rural residential, agricultural and other uses such as the Model Park.

The option connected to Elizabeth Drive via ramps, with Elizabeth Drive upgraded to a principal arterial road, and connected with The Northern Road.

4.5.6 Modified Purple option (A3-B2-C4)

The modified purple option was about 16 kilometres long. It connected to the M7 Motorway at the same location as the existing Elizabeth Drive interchange.

The option generally followed the Elizabeth Drive alignment to the Mamre Road intersection. The alignment was on a more direct route than Elizabeth Drive to meet current design standards and to avoid the steep topography to the north of Elizabeth Drive. As this option would be built in the existing Elizabeth Drive corridor as much as possible, Elizabeth Drive would need to be reconstructed around the motorway.

The option passed through Western Sydney Parklands (including a section of the Wylde Mountain Bike Trail) and a few commercial properties fronting Elizabeth Drive or Mamre Road, including the Hi-Quality Group property and CSR Brickworks. Around the existing intersection with Mamre Road, it traversed north-west, crossing Kemps Creek.

The option then went around the north of Kemps Creek village north of Elizabeth Drive, passing through rural agricultural and residential properties. It also passed through some larger businesses including a quarry site and Andreasens Green Nursery. It crossed South Creek, skirting south of the landfill site and crossing Badgerys Creek. It then connected to the planned Western Sydney Airport site through an interchange. The distance between the option and Elizabeth Drive in this area varied; at its furthest, the corridor was 700 metres away.

The option then crossed Cosgroves Creek and passed through rural and agricultural properties before crossing Luddenham Road about 1.2 kilometres north of the intersection with Elizabeth Drive and north of Blackford Hill. It passed through rural residential, agricultural and other uses such as the Luddenham Raceway. The option connected to The Northern Road about 900 metres north of the existing Elizabeth Drive roundabout.

4.5.7 Modified White option (A3-B5-C3)

The modified white option was about 17 kilometres long. It connected to the M7 Motorway at the same location as the existing Elizabeth Drive interchange.

The option generally followed the Elizabeth Drive alignment to the Mamre Road intersection. The alignment was on a more direct route than Elizabeth Drive to meet current design standards and to avoid the steep topography to the north of Elizabeth Drive. As this option would be built in the existing Elizabeth Drive corridor as much as possible, Elizabeth Drive would need to be reconstructed around the motorway.

The option passed through Western Sydney Parklands (including a section of the Wylde Mountain Bike Trail) and several commercial properties fronting Elizabeth Drive or Mamre Road including the Hi-Quality Group property and CSR Brickworks. Around the existing intersection with Mamre Road, it traversed north-west, crossing Kemps Creek.

The option then traversed north-west, parallel to Clifton Avenue, before heading west and passing through the former Fleurs radio telescope site and crossing South Creek. It passed to the north of the landfill site, crossing Badgerys Creek before connecting to the planned Western Sydney Airport site via an interchange. The distance between the option and Elizabeth Drive varied; at its furthest, the corridor was around 1750 metres away.

The option then crossed Cosgroves and Oaky creeks near the confluence of the creeks, before crossing Luddenham Road just north of the intersection with Elizabeth Drive and south of Blackford Hill. It passed through rural residential, agricultural and other uses such as the Model Park.

The option connected to Elizabeth Drive via ramps, with Elizabeth Drive upgraded to a principal arterial road, and connected with The Northern Road.

4.5.8 Modified Yellow option (A3-B5-C4)

The modified yellow option was about 16 kilometres long. It connected to the M7 Motorway at the same location as the existing Elizabeth Drive interchange.

The option generally followed the Elizabeth Drive alignment to the Mamre Road intersection. This alignment was on a more direct route than Elizabeth Drive to meet current design standards and to avoid the steep topography to the north of Elizabeth Drive. As this option would be built in the existing Elizabeth Drive corridor as much as possible, Elizabeth Drive would need to be reconstructed around the motorway.

The option passed through Western Sydney Parklands (including a section of the Wylde Mountain Bike Trail) as well as several commercial properties fronting onto Elizabeth Drive or Mamre Road including the Hi-Quality Group property and the CSR Brickworks. Around the existing intersection with Mamre Road, it traversed north–west, crossing Kemps Creek.

The option then went north–west, parallel to Clifton Avenue, before heading west and passing through the former Fleurs radio telescope site and crossing South Creek. It passed to the north of the landfill site, crossing Badgerys Creek before connecting to the planned Western Sydney Airport site via an interchange. The distance between the option and Elizabeth Drive in this area varies; at its furthest, the corridor was 1750 metres away.

The option then crossed Cosgroves Creek and passed through rural and agricultural properties before crossing Luddenham Road about 1.2 kilometres north of the intersection with Elizabeth Drive and north of Blackford Hill. It passed through rural residential, agricultural and other uses such as the Luddenham Raceway.

The option connected to The Northern Road about 900 metres north of the existing Elizabeth Drive roundabout.

4.5.9 Evaluation and selection of the preferred route

The modified shortlisted options were evaluated at a value management workshop on 7 April 2016 with the aim of recommending a preferred corridor route for the M12 Motorway. The participants included a range of stakeholders including the Australian and NSW Government agencies, local councils and the project team.

The attendees reviewed and made minor updates to the assessment criteria that had been developed during the first value management workshop held in October 2015 (see **Section 4.4**). The revised criteria are presented in the M12 Motorway Strategic Route Options Analysis: Preferred Corridor Route Option report (Roads and Maritime, 2016b).

The evaluation of the modified shortlisted options was informed by the findings of the following technical studies, which had involved desktop assessment and field investigation:

- Biodiversity
- Aboriginal and non-Aboriginal heritage
- Land use and planning
- Socio-economic (including noise, traffic access and business impact)
- Soils and contamination
- Hydrology and flooding
- Landscape character
- Utilities.

The results of the environmental investigations together with community feedback and preliminary costings were used by workshop participants to carry out a comparative assessment of each option against the criteria and to recommend a preferred route.

The preferred route option for the M12 Motorway was identified as the modified orange option comprising a combination of route options A1, B5 and C4. The preferred route option is shown in **Figure 4-4**. The preferred route was publicly announced in November 2016.

The modified orange option was preferred to the other options as:

- It would have less overall impact on existing land use and provide greater flexibility for future land use development
- It would have less impact on listed threatened ecological communities and species
- It would minimise impact on the M7 Motorway by locating the M12 Motorway interchange an appropriate spacing to adjacent interchanges on the M7 Motorway
- It would involve less severance of land and businesses
- It would have better functionality for future traffic
- It would have less impact on utilities
- It would have less impact on existing roads
- It would maintain the integrity, and improve management, of the existing road network
- It would be easier and safer to construct, being located away from live traffic conditions.

Further detail on the evaluation of options against the assessment criteria is presented in the **M12 Motorway Strategic Route Options Analysis: Preferred Corridor Route Option report** (Roads and Maritime, 2016b).

4.6 Refinements to the preferred route through the Western Sydney Parklands

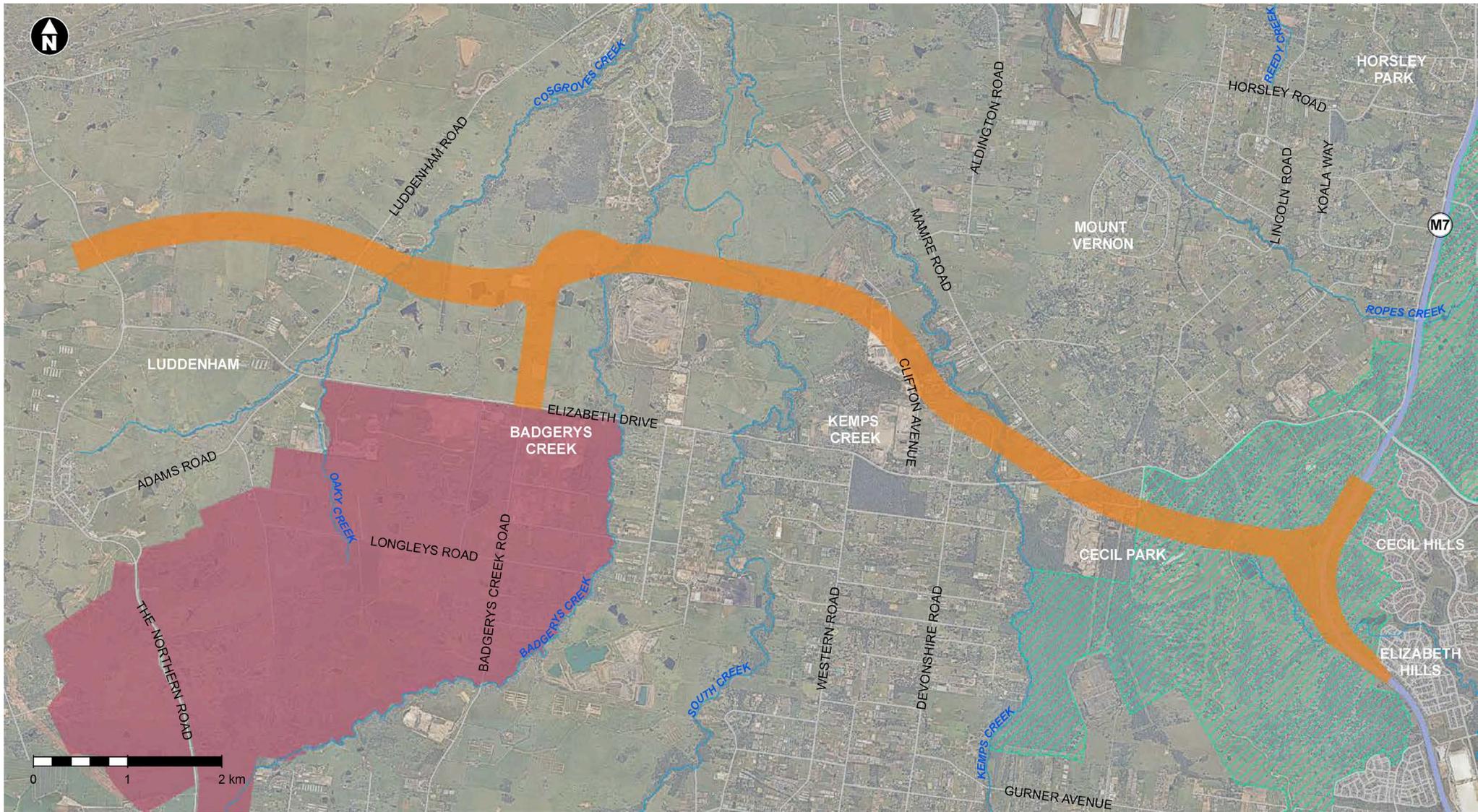
Following the announcement of the preferred route option, two strategic planning documents were drafted; the draft South-west District Plan by the Greater Sydney Commission (GSC) and the Southern Parklands Framework by the Western Sydney Parklands Trust (WSPT, 2018b). These two plans outlined the future land use within the area of the M12 Motorway.

It was identified that the preferred route option was in direct conflict with the future land use within the Western Sydney Parklands.

In March 2017, Roads and Maritime held multiple discussions with the Greater Sydney Commission and the Western Sydney Parklands Trust on how the preferred route option would fit within the Commission's plans in this area and how the potential impact on the Western Sydney Parklands could be reduced. Roads and Maritime committed to investigate alternative corridor options through the Western Sydney Parklands, between Mamre Road and the M7 Motorway, to reduce impacts on connectivity within the Western Sydney Parklands and ensure impacts on the Parklands' recreation facilities are minimised.

The Western Sydney Parklands could not be completely avoided due to its north–south extent and the need to provide an east–west connection to the M7 Motorway. An option further to the north of the Western Sydney Parklands (Option A2) had already been considered during the long list route options phase and was ruled out as it would cause extensive property and community impact and have constructability issues.

Three alternative alignment options were therefore developed within the Western Sydney Parklands as discussed in the following sections.



-  Motorway
-  Other roads
-  Waterways
-  Preferred route corridor (announced November 2016)
-  Western Sydney Airport



Figure 4-4 Preferred route option

Date: 28/06/2019 Path: J:\E\Projects\04_Eastern\A145100\08_Spatial\GIS\Directory\Templates\MXD\Figures\EIS\Chapters\Chapter4_ProjectDevelopment\Final\EIS\JA\JV_EIS_Chap4_F005_M12PreferredOption_r3v1.mxd Created by: AA | QA by: JC

4.6.1 Options within Western Sydney Parklands

Three alignment options within the Western Sydney Parklands were developed and named as Option 1, Option 2 and Option 3. Each option passed through the Western Sydney Parklands with each being developed progressively north of the preferred route option. All options converged at the same point west of Range Road to tie-in to the remainder of the M12 Motorway preferred route option.

The three alignment options are shown in **Figure 4-5** and described as follows:

- **Option 1** passed slightly further north than the modified orange route identified from the SROA. Option 1 had an increased impact on the existing Wylde Mountain Bike Trail, but reduced the impact on the passive recreation area identified in the Draft Southern Parklands Vision. The design of Option 1 was on a fill embankment over the Sydney Water Upper Canal, with an interchange at the M7 Motorway that was independent from Elizabeth Drive.
- **Option 2** passed to the north of Option 1 and to the south of the Air Services Australia Radar Site.
- **Option 3** was the northernmost alignment of the three options, close to Elizabeth Drive. Option 3 passed through the Wylde Mountain Bike Trail, but avoided the passive recreation area identified in the Draft Southern Parklands Vision. Option 3 required a complex interchange at the M7 Motorway due to the interaction with Elizabeth Drive and Wallgrove Road.

4.6.2 Evaluation and selection of the preferred option

The three options were presented to Western Sydney Parklands Trust on 2 May 2017 for feedback.

A supplementary value management workshop was held in June 2017. The workshop was attended by representatives from Australian and NSW Government agencies, local councils and key stakeholders. Stakeholder input informed a multi-criteria analysis (based on the assessment criteria set out in **Section 4.4**) to recommend either the retention of the preferred route option from 2016 (modified orange option) or recommend an alternative route option.

Following a preliminary review by the project team, Option 2 (as presented in **Section 4.6.1**) was discounted as it would result in the largest environmental impact, have the highest cost, required the largest amount of imported fill and pass through a significant area of geotechnical instability. Therefore, the evaluation of options in the value management workshop did not include Option 2.

Together with the preferred route option (modified orange option), Option 1 and Option 3 were assessed against the project objectives and selection criteria. The potential impacts of each option were based upon field investigations and community consultation carried out during the shortlisted options phase.

It was found that:

- The preferred route option (modified orange option) identified from the SROA was deemed to cause the most significant intrusion on the Western Sydney Parklands.
- Option 1 would have similar overall impacts on the modified orange option but would have a lesser direct impact on the Sydney Water Upper Canal.
- Option 3 would have an impact on the integrity of the WSPT Southern Parklands Framework (WSPT, 2018b), but would result in the least impacts overall.

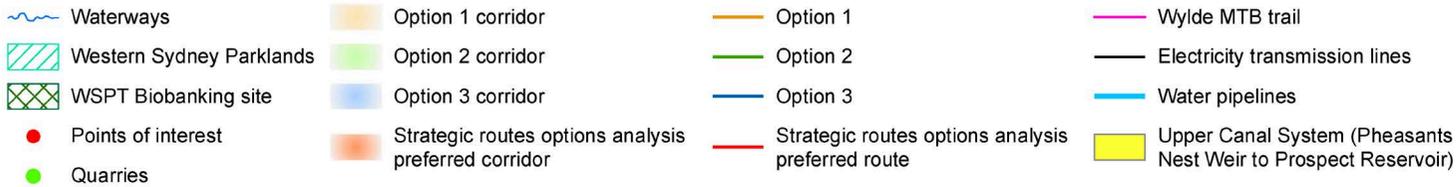
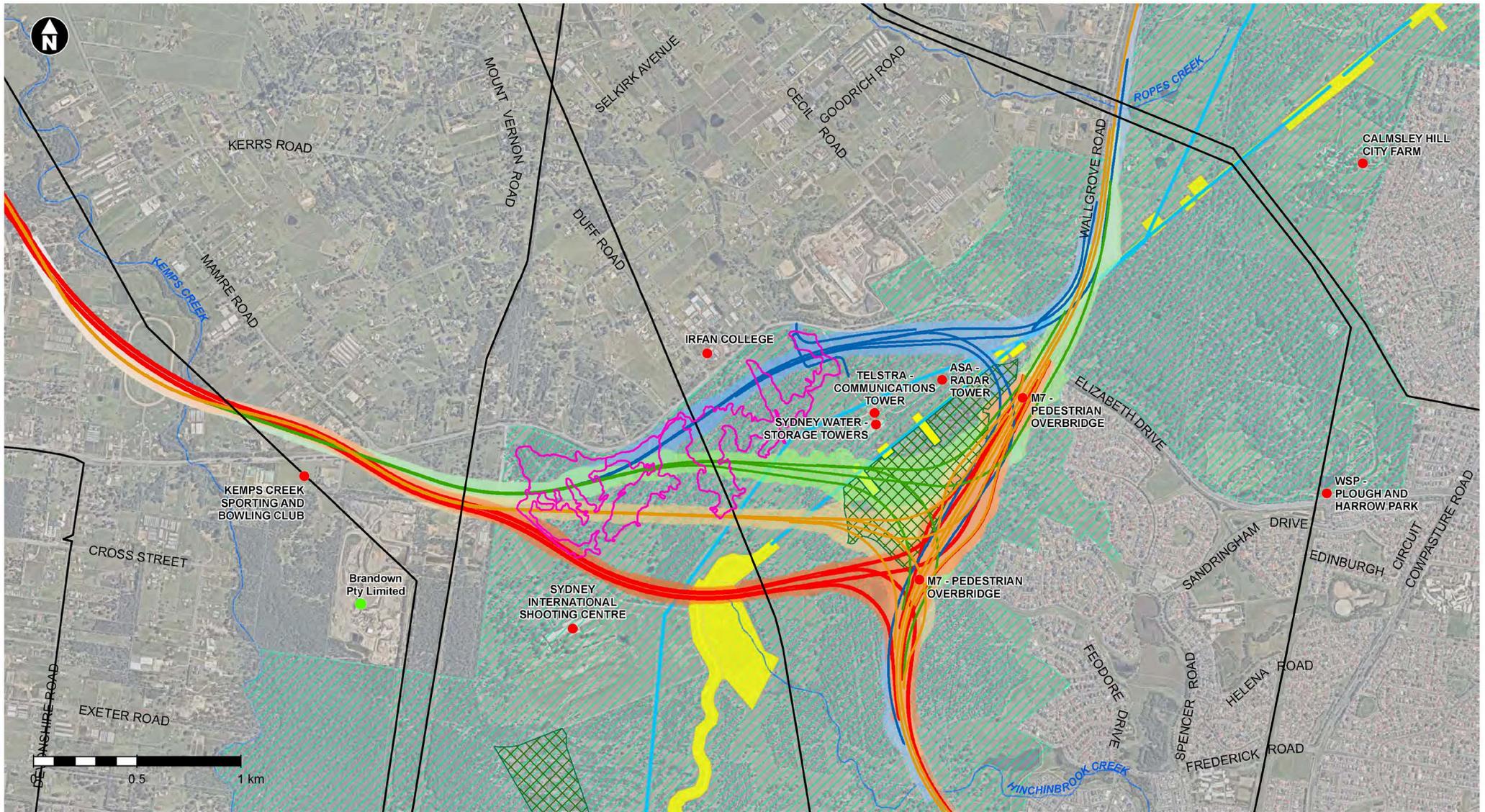


Figure 4-5 Route options in the Western Sydney Parklands

Date: 22/07/2019 Path: J:\IE\Projects\04_Eastern\145100\08_SpatialGIS\Directory\Templates\MXDs\Figures\EIS\Chapters\Chapter4_ProjectDevelopment\FinalEIS\JA\J_V_EIS_Chap4_F03_WSPRouteOptions_r2v1.mxd Created by: AA | QA by: ML

Based on the relative overall performance against the selection criteria, Option 3 was recommended as the new preferred corridor through the Western Sydney Parklands as it would:

- Deliver on the vision for the Western Parkland City
- Best meet the overall project objectives for the community in the Parklands
- Provide the best integrated land use and transport option
- Maintain the integrity of Western Sydney Parklands for future generations
- Protect scenic and cultural landscapes by locating the new infrastructure closer to disturbed areas
- Reduce community severance.

Further details on the evaluation against criteria can be found in the Value Management Report: Eastern Section of the M12 Motorway (Roads and Maritime, 2018a).

The refined preferred corridor route option therefore comprised B5 and C4 from the preferred route option (modified orange option) and Option 3 through the Western Sydney Parklands, as shown in **Figure 4-6**. This new preferred option was announced to the community in February 2018.

4.7 Design options and refinements

Following selection of the preferred route corridor as described in **Section 4.2** to **Section 4.6**, a concept design was developed for the motorway. The concept design development process included:

- Refinement of the route alignment (see **Section 4.7.1**)
- Interchange/intersection options assessment (see **Section 4.7.2**)
- Shared user path options assessment (see **Section 4.7.3**)
- Consideration of several design refinements, within the preferred corridor route, to improve performance, safety and environmental outcomes associated with the motorway (see **Section 4.7.4**).

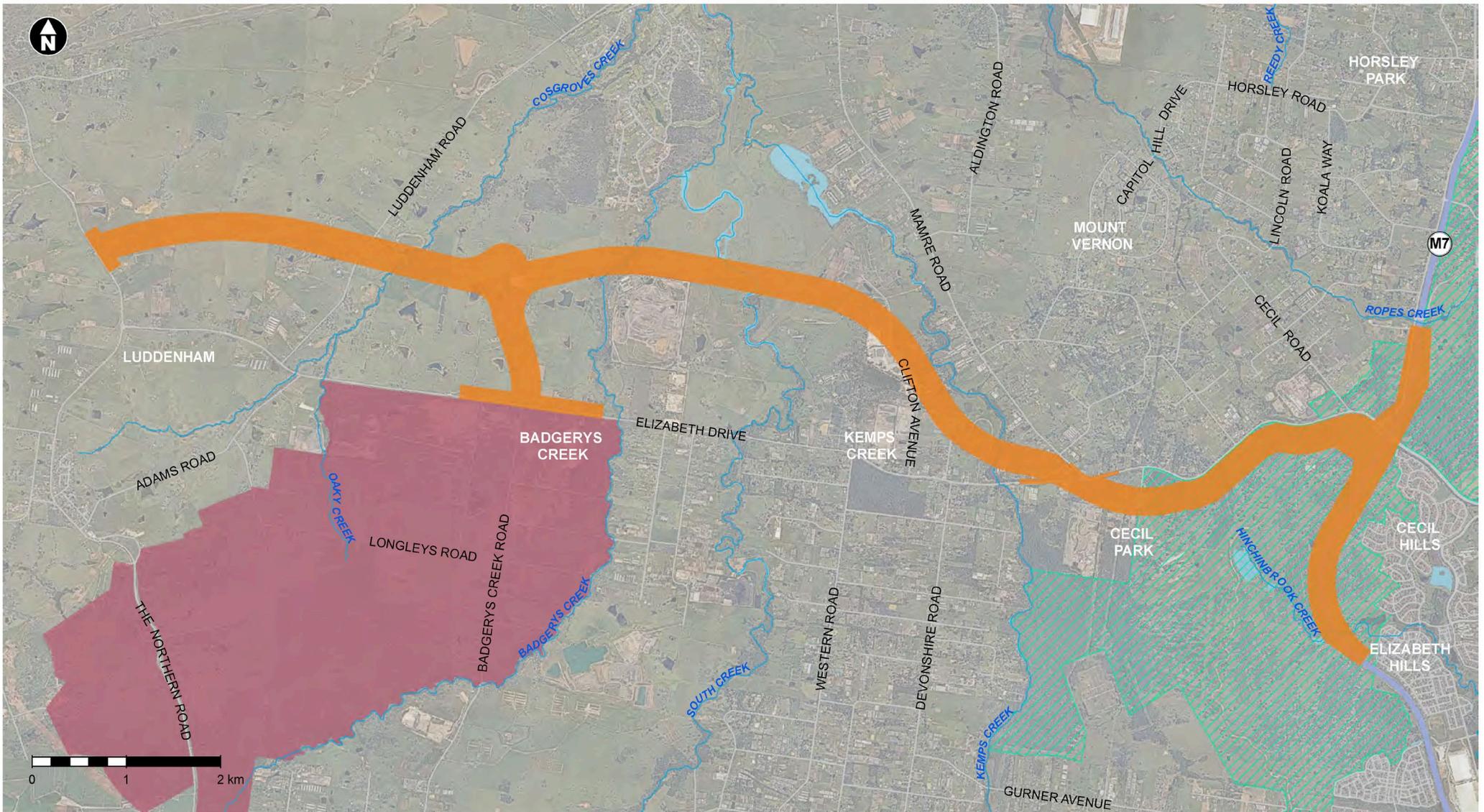
Roads and Maritime held a series of value management and value engineering workshops in March 2017, November 2017 and October 2018 to develop design and refinement options. Representatives from the (now) Department of Infrastructure, Transport, Cities and Regional Development, Roads and Maritime (including the Traffic Management Centre) and the project team attended the workshops.

Like the route options selection, the methodology to evaluate and determine design options involved a multi-criteria analysis process to identify key issues and assessment criteria. The performance of the options was evaluated against each of the assessment criteria to establish a relative overall ranking between the options.

The key options considered, and the preferred option in each case, are described below.

4.7.1 Refinement of route corridor alignment

Following selection of the preferred route, the following options were considered between Kemps Creek and South Creek to avoid and minimise impacts on the 500 kilovolt (kV) transmission line, property and biodiversity. Options are described in **Table 4-10** and shown in **Figure 4-7**.

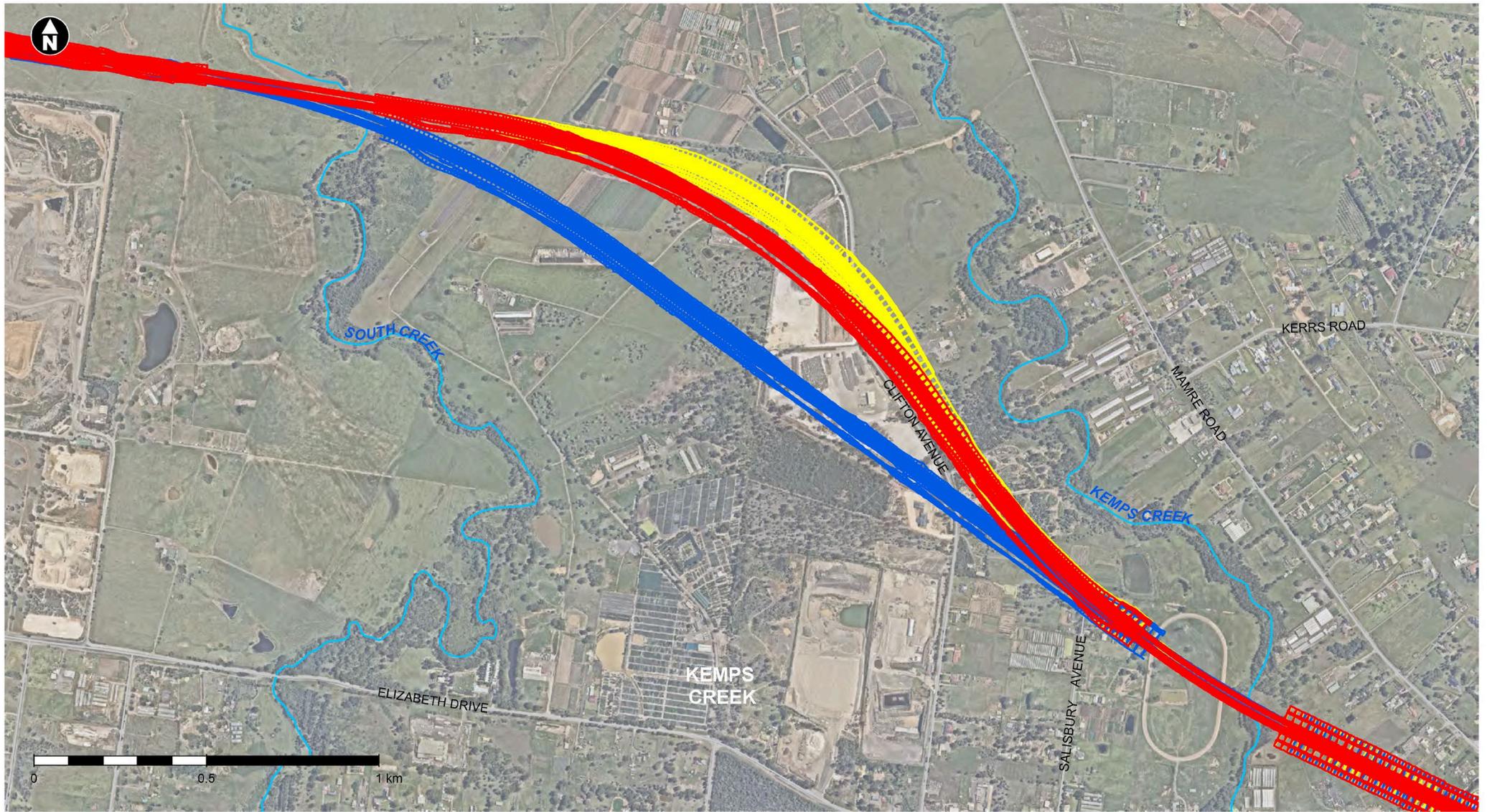


- Refined preferred route corridor (announced February 2018)
 - Motorways
 - Western Sydney Parklands
 - Other roads
 - Western Sydney Airport
 - Waterways
- Note. The roads within this zone are being removed as part of airport construction.



Figure 4-6 Refined preferred route corridor

Date: 27/06/2019 Path: J:\E\Projects\04_Eastern\145100\08 Spatial\GIS\Directory\Templates\MXD\Figures\EIS\Chapters\Chapter4_ProjectDevelopment\Final\EIS\JA\JV_EIS_Chap4_F001_PreferedRoute_3v1.mxd Created by: AA | QA by: JC



- Main roads
 - ~ Waterways
- Alignment refinement options between South Creek and Kemps Creek**
- Option 1
 - Option 2
 - Option 3



Figure 4-7 Route optimisation between South Creek and Kemps Creek

Date: 24/06/2019 Path: J:\IE\Projects\04_Eastern\A145100\08_Spatial\GIS\Directory\Templates\MXD\Figures\EIS\Chapters\Chapter4_ProjectDevelopment\FinalEIS\JA\JV_EIS_Chap4_F007_M12RefinedOptions\9hCkKempsCk_r1v1.mxd Created by : AA | QA by : JC

Table 4-10 Route optimisation between Kemps Creek and South Creek

Alignment refinement options	Description
Option 1	Option 1 provides a horizontal radius curve of 1200 metres to connect to the straight alignment over South Creek, and overpasses Clifton Avenue.
Option 2	Option 2 provides a horizontal radius curve of 3000 metres tying into South Creek bridge and is generally a straight alignment between this curve and Kemps Creek bridge. The option crosses Clifton Avenue at grade and would require Clifton Avenue to be realigned, and an overpass of the M12 Motorway to maintain connectivity.
Option 3	Option 3 provides a horizontal radius curve of 2000 metres. The option crosses Clifton Avenue at grade and would require Clifton Avenue to be realigned, and an overpass of the M12 Motorway, to maintain connectivity.

Option 3 was selected as the preferred option for the following reasons:

- It is the best performing option overall
- It would achieve a higher quality horizontal alignment compared to Option 1, removing the need for super-elevation
- Its traffic level of service, functionality and reliability best matches the performance expectations
- It would avoid impacts on the SUEZ Kemps Creek Resource Recovery Park and adjacent property
- It would result in less sterilised land to the north of the M12 Motorway.

4.7.2 Interchange/intersection options

M7 Motorway interchange

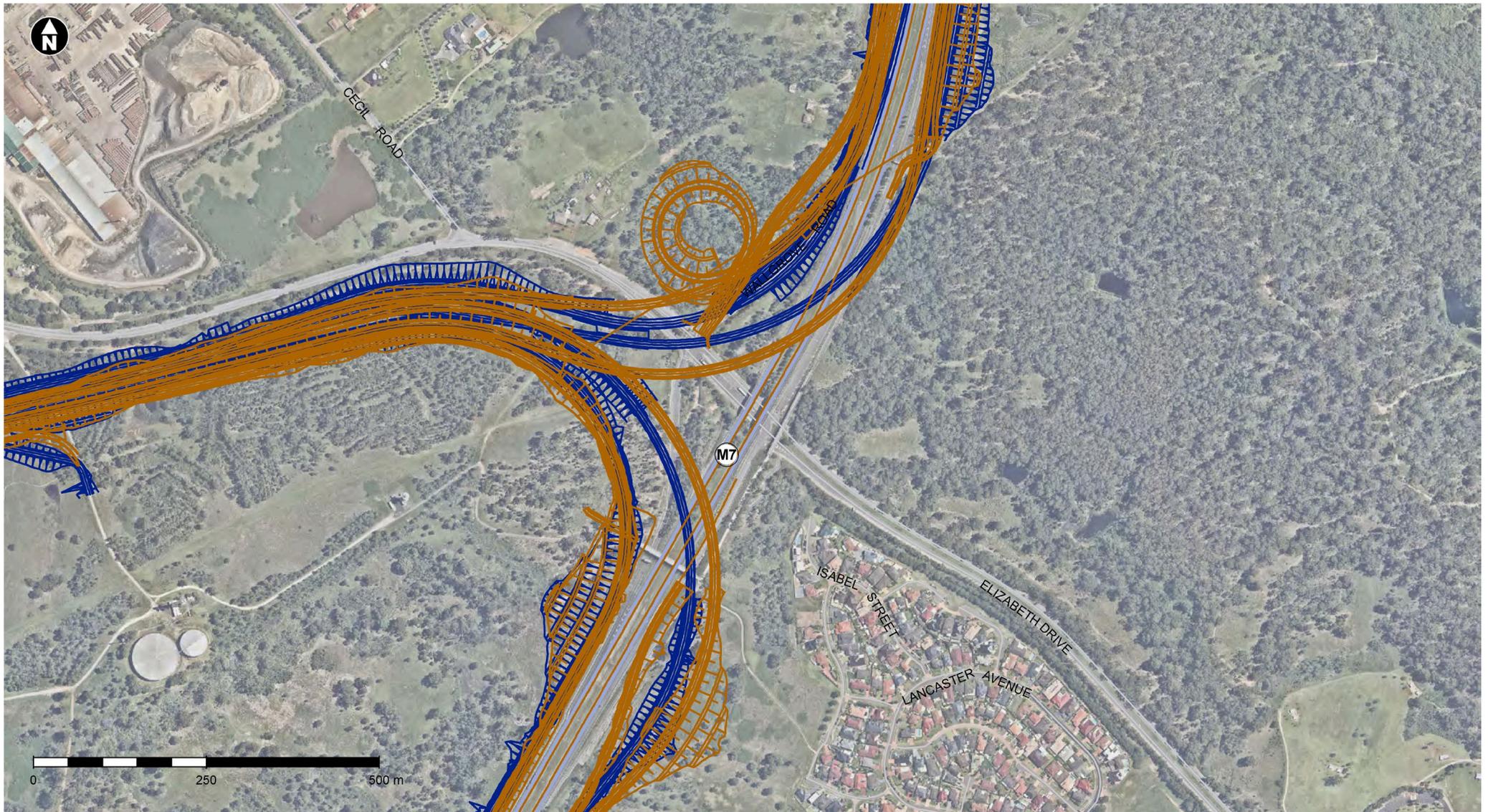
Several options for the M7 Motorway interchange with the M12 Motorway were investigated as part of the development of the design as set out in this document. The following design aspects were considered:

- Ramp lengths and configurations
- Tie-in locations
- Merging and safety
- Tie-ins to the toll road of the M7 Motorway
- Connection to Wallgrove Road.

These options were refined to two interchange options, as described in **Table 4-11** and shown in **Figure 4-8**.

Table 4-11 M7 Motorway interchange options

M7 Interchange option	Description
Option 1 – G loop	Option 1 provides a G loop onto the northbound entry ramp, maintaining northbound connectivity to the M7 Motorway.
Option 2 – Separate ramp entries to the M7 Motorway	Option 2 provides separate northbound and southbound ramp entries with the M7 Motorway from the M12 Motorway.



- Motorway **M12 eastbound - M7 northbound ramp design options**
- Main roads Option 1
- Option 2



Figure 4-8 M7 Motorway interchange option 1 and option 2

Date: 22/07/2019 Path: J:\IE\Projects\04_Eastern\A145100\08_Spatial\GIS\Directory\Templates\MXDs\Figures\EIS\Chapters\Chapter4_ProjectDevelopment\Final\EIS\J_V_EIS_Chap4_F008_M12EastboundM7NorthboundRamp_r1v1.mxd Created by: AA | QA by: JC

Option 1 was recommended as the preferred interchange option as it would provide a single point of entry to the M7 Motorway, allowing a free-flowing connection to the M7 Motorway which, in turn, links the M5 Motorway, M4 Motorway and M2 Motorway.

Option 2 has the following advantages over Option 1:

- Simpler construction staging as the existing Wallgrove Road entry would remain untouched
- Reduced imported fill volume by about 100,000 cubic metres
- Reduced property acquisition
- Reduced heritage and biodiversity impacts and associated offsets due to a smaller footprint.

However, Option 2 was not recommended as the close spacing between the consecutive merges of the two ramp entries to the M7 Motorway would potentially create a safety issue. Due to the advantages of Option 2, Roads and Maritime will carry out further investigation into the M7 Motorway connection ramps so that the diversion of traffic to the north and south can be resolved in a safe manner.

Western Sydney Airport interchange

Options for the Western Sydney Airport interchange included reconfiguration of the entry and exit ramps. Each option considered:

- Design speed
- Geometry
- Safety.

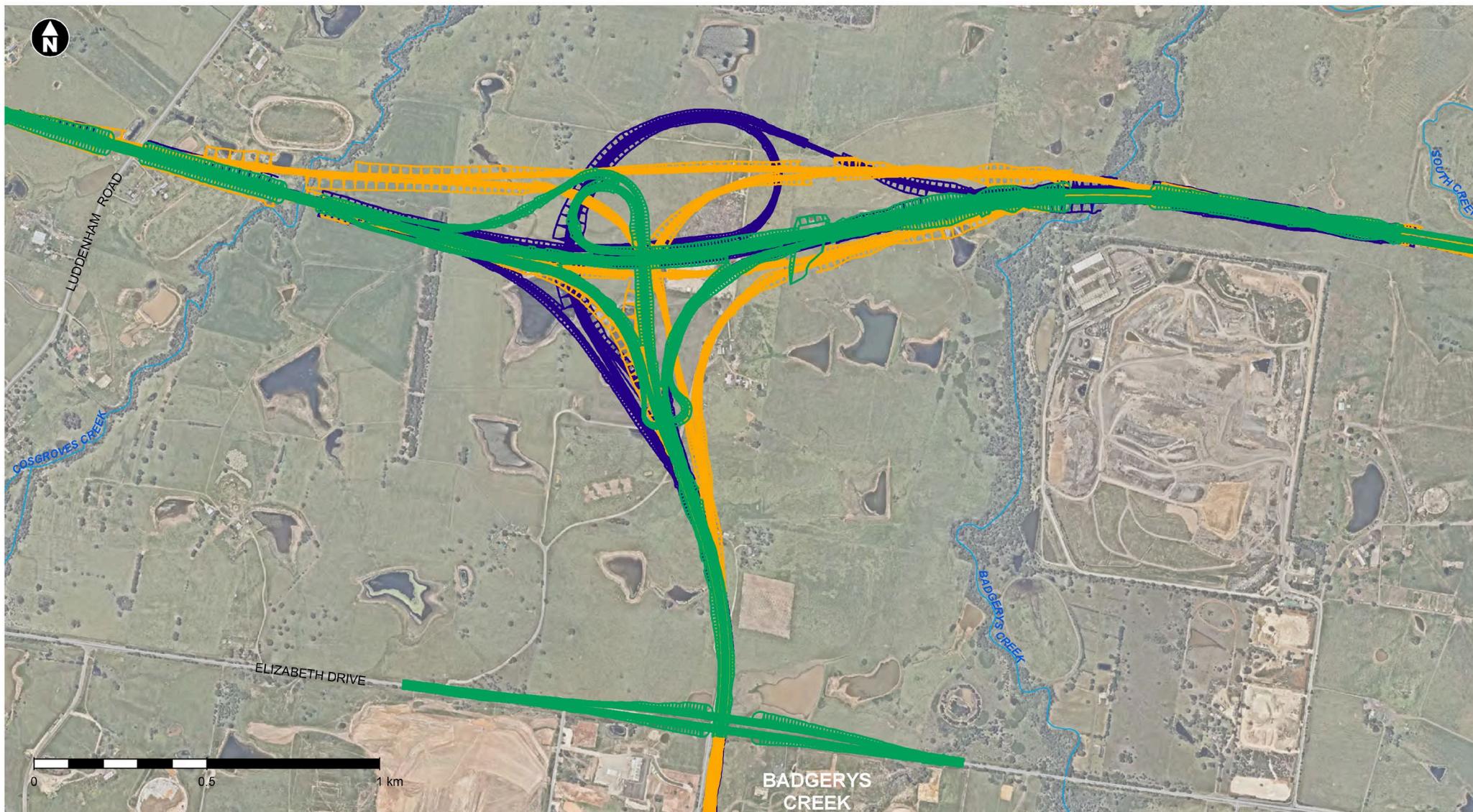
Three options were developed to manage the flow of traffic between the Western Sydney Airport and the M12 Motorway ramps, as described in **Table 4-12** and shown in **Figure 4-9**.

Table 4-12 Western Sydney Airport interchange options

Western Sydney Airport interchange option	Description
Option 1 – Smaller trumpet interchange	Option 1 is a trumpet interchange to manage the flow of traffic between the airport and M12 Motorway ramps. The eastbound entry into, and westbound exit from the airport would remain free flowing. Eastbound traffic from the airport access road to the M12 Motorway would be required to navigate a tighter loop radius than Option 2. The clearance height of the interchange would allow the future rail corridor to underpass the motorway when built.
Option 2 – Larger trumpet interchange	Option 2 is a modified version of Option 1, with a larger loop radius which gives priority movement for eastbound traffic from the airport access road to the M12 Motorway.
Option 3 – M12 carriageway separated through interchange	Option 3 provides a median between the M12 eastbound and westbound carriageways widened through the interchange with free-flowing ramps for all movements and ramps from the eastbound carriageway diverging from the median side.

Option 1 was selected as the preferred option for the following reasons:

- It would have less footprint impacts, eg biodiversity, heritage and creek lines
- It would be compatible with the future Outer Sydney Orbital interchange and changes to traffic movement
- It would integrate with the Sydney Metro Greater West alignment.



- Other roads
 - ~ Waterways
 - Option 1
 - Option 2
 - Option 3
- Western Sydney Airport interchange design refinement options**



Figure 4-9 Western Sydney Airport interchange option 1, option 2 and option 3

Date: 24/06/2019 Path: J:\E\Projects\04_Eastern\A145100\08_Spatial\GIS\Directory\Templates\MXDs\Figures\EIS\Chapters\Chapter4_ProjectDevelopment\Final\EIS\JAV_EIS_Chap4_F009_M12WSAOption1\CosgroveCK\SitsCK_r1v1.mxd Created by: AA | QA by: JC

M12 Motorway / Elizabeth Drive / Airport entry

The M12 Motorway would need to traverse Elizabeth Drive to enter the Western Sydney Airport. Two main options were considered at this location, as described in **Table 4-13**.

Table 4-13 M12 Motorway options at Elizabeth Drive and airport entry

M12 Motorway/Elizabeth Drive	Description
Option 1: grade separation	Option 1 involves realigning Elizabeth Drive via a bridge over the airport access road and proposed rail alignments.
Option 2: at-grade intersection	Option 2 involves an at-grade intersection of the M12 Motorway with Elizabeth Drive, with a set of traffic signals. This option would comprise a signalised at-grade intersection between Elizabeth Drive and the airport access road, as well as an adjacent railway level crossing to accommodate the proposed Sydney Metro Greater West alignment.

The preferred solution adopted as part of the project was Option 1, in which Elizabeth Drive would be carried on a bridge over the airport access road (see **Section 5.1**). This option was chosen as it would provide uninterrupted access to the Western Sydney Airport, thereby reducing traffic congestion.

4.7.3 Shared user path options

The following options for the shared user path (for cyclists and pedestrians) were considered:

- Option 1 – a path on the southern side of the entire M12 Motorway
- Option 2 – a path on the southern side of the M12 Motorway until the Western Sydney Airport interchange, where the path would switch to the northern side.

Each option aims to provide a connection between Range Road and The Northern Road. Option 2 was selected as the preferred option because it would better integrate with future land use for open space, consistent with the Greater Sydney Commission’s vision for the Western Parkland City as described in **Section 3.2.3** and **Section 4.6**, and in the socio-economic assessment in **Section 7.4**.

4.7.4 General design refinements to avoid or minimise environmental impacts

The design of the M12 Motorway has undergone numerous revisions of the design. **Table 4-14** describes the design refinements that were made to avoid or minimise environmental impacts.

The environmental impacts will be further minimised during detailed design and construction, through the recommended mitigation measures (see **Chapter 9**).

Table 4-14 Project design refinements

Design refinement	Reason
Revised vertical grading from the Elizabeth Drive and Mamre Road Intersection to the M7 Interchange	To reduce embankment height and reduce the amount of fill required
Horizontal alignment of the M12 Motorway at Elizabeth Drive shifted by about 30 metres to the south-west at Elizabeth Drive crossing near Mamre Road	To avoid the need to reconstruct existing roundabout at Elizabeth Drive and Mamre Road
The vertical alignment grading changes at embankments west of Western Sydney Parklands	To reduce net import of fill material for the project
Airport interchange layout compacted	To reduce the footprint of the interchange and minimise impacts on dams
Change in shared user path that underpasses the Airport Interchange westbound entry ramp via a large culvert structure	To reduce the footprint of the project To leave the potential open for the shared user path to connect to potential future development to the north of the M12 Motorway and the green grid
Pedestrian bridge over M7 Motorway near Elizabeth Drive and South of Elizabeth Drive retained	To retain pedestrian access To provide significant safety improvements as the bridge does not have to be demolished over the existing M7 Motorway
Additional refinement of cut batters east of Range Road to the M7 Interchange	To reduce the footprint of the project To reduce the length of the utilities access road crossing the M12 Motorway
M7 Motorway southbound to M12 Motorway ramp bridge radius tightened	To reduce impacts on the vegetation directly east To allow the bridge to pass positions across the large span where bridge piers can be located with minor impacts on Elizabeth Drive, the M7 Motorway and major utilities
M7 Motorway northbound to M12 Motorway ramp alignment was shifted towards the M7 Motorway	To reduce the footprint of the project To minimise encroachment into the biodiversity offset area in Western Sydney Parklands
Shared user path bridge relocated on the following bridges: <ul style="list-style-type: none"> • Cosgroves Creek bridge • Badgerys Creek bridge • South Creek bridge 	To allow property access
Shared user path bridge relocated on: <ul style="list-style-type: none"> • Airport access road overbridges • Clifton Avenue overbridge 	To allow the shared user path to transition to future areas listed to be developed into recreation open space

4.8 The project

The M12 Motorway with the new preferred alignment through the Western Sydney Parklands was announced in February 2018 and is shown in **Figure 4-6**. The preferred option forms the basis of the design development for the project that is the focus of this EIS (as shown in **Figure 1-1**).

As discussed throughout this chapter, the preferred option and design for the project were identified and refined through an extensive assessment and review process to ensure that it best meets the project objectives, is evaluated against the key performance criteria of function, environment and socio-economic considerations and ultimately provides value for money.

The project incorporates the preferred option and the design refinements described throughout this chapter. In summary, the project consists of:

- A new dual-carriageway motorway, with two lanes in each direction, between the M7 Motorway and The Northern Road
 - Running mostly along the modified orange route option
 - Running through the Western Sydney Parklands through Option 3A, ensuring minimal impacts on the Parklands
- A motorway-to-motorway interchange with the M7 Motorway
- A grade-separated interchange with the Western Sydney Airport
- Realignment of Elizabeth Drive and other local roads to maintain existing routes and tie-in with the M12 Motorway.

An overview of the project is shown in **Figure 1-1** and described in further detail in **Chapter 5**.

Refinements to the design as set out in this document may occur as a result of submissions received as part of the community consultation and EIS submission process. The design may also be refined during the detailed design of the project.